# HOUSING PROCESSES AND THEIR TRANSFORMATIONS

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I declare that this thesis is my own
original work

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ABSTRACT

This thesis approaches the housing problem in Developing Countries from the point of view of architectural praxis. Thus the (housing) built environment of two distinct societies is compared; and to this end three modes of production of housing have been chosen and analyzed. One of these is from "primitive communist" societies (the Fali and Dagomba of Central West Africa) and two are from modern capitalist societies (Latin America, particularly Mexico). The housing problem and architectural phenomena are approached comprehensively by studying their relation with society at large and by taking into account the variety of factors affecting the production processes, the organization of space and patterns of built form. An investigation is made of how particular spatial structures are connected to the behavioural processes that produce them. For this a structuralist approach is adopted.

The theoretical framework is used to analyze the three housing processes ("primitive", popular and the one organized through public institutions) both through the functions of architecture they render and the transformations occurring within and between them. The conceptualization of the functions is aimed at identifying and formulating the structure of each function of architecture. These functions are the Symbolic, Climatic, Aesthetic, Political, Economic and Behavioural ones. Through analyzing the transformations (temporal, territorial and historical), the key problems of housing (causes and effects) are identified. Certain qualitative and quantitative features characterize them. These are expressed in the increasingly antagonistic housing patterns in which the chief modifier is inherent in the mechanism and structures of capitalism.

The structural-functionalist approach used is comprehensive, objective and multidisciplinary. It is objective in providing a comprehensive descriptive framework on the basis of which the housing problem and architectural phenomena can be characterized and explained, and it proves to have considerable problem-solving capacity within architectural praxis because it enables the analysis of descriptive models through the use of the SCAPEB functions. This provides a way of bridging the gap between architectural theory and praxis. The approach also allows a concentration upon the functions of architecture within which it is sought to achieve the objectives of research without reducing the dynamic totality of the housing process. Finally, the approach is operationally advantageous as a means of organizing social and economic structures and to design and build physical ones.

A framework is proposed within which an alternative mode of production (primarily of housing) among marginal communities could emerge. The re-structuring of their economy is suggested based upon principles which would operate under (i) a comprehensive strategy for development (e.g. integration of production of goods, food and housing); (ii) an autonomous subsystem; (iii) collective ownership and management (localized socialization); and (iv) the structuring of cooperatives at various levels. These must be supported by the political organization of the community.

Further research is suggested related to the methodology itself and strategies of its possible application.

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# GENERAL INTRODUCTION

It is now generally recognized that under-development, neo-colonialism, population growth and capitalism in general contribute to, and very often cause, the problems of poverty and shortages of housing; especially in countries of the Third World. Particular results are the rise of overcrowding and the development of squatter settlements, shantytowns, and other forms of housing. A characteristic of Third World countries is the uneven distribution of income and widespread unemployment. These directly concern those areas just mentioned where the poor live and which often show high rates of illness, illiteracy and malnutrition. In particular areas delinquency and prostitution seem to be common, tend to increase or easily emerge. All these problems are interconnected and to some extent one problem fosters the others. This thesis attempts to approach this legacy of history from the point of view of architectural praxis.

This praxis changes its premises and its domain in different societies and cultures. In some of these, problems of shelter or shortage of housing do not exist, whilst in others they tend to be quite acute. Therefore the approach is central to the analysis of relationships between housing and society.

Housing is produced through particular forms of human organisation pertaining to cultures or subcultures. Squatter housing and that of other low-income groups has been created by people deliberately, but sometimes through unforseen interconnections and consequences; and yet it remains as a social product, as part of their (displaced) culture. What is

important here is the way houses are created and to ask which particular forces determine their form (Lechuga G, L.E., 1979, p. 69). Consequently it was seen to be necessary to study the way people produce space and the way architects create architecture (ibid p. 77). This implied the need to take into account both the production of housing by low-income groups (e.g. squatters) who manage to build without either financial or professional assistance, and official attempts at providing solutions for certain (selected income) groups.

The problem of housing is a qualitative as much as a quantitative one. Consequently the perspective of the thesis has the following orientations:

1. The legacy of architectural theory is taken into consideration; mainly its central theme which revolves around the idea of the coherent artificial organization of space for the purpose of human habitation and activity; and the meaning of that space and its enclosing forms for its users and for society as a whole.

2. The housing problem and architectural phenomena are approached comprehensively; that is by studying their relation with society at large and by taking into account the variety of factors affecting the transformation of production, the organization of space and the physical envelope. This is done both through the strategy of the research - comparing the (housing) built environment of two distinct societies which have quite different social and economic organization - and by

the methodology used, which unfolds as follows:

3. The notion of function is applied to architecture. The conceptualization of the functions seeks to identify and formulate the structure of each function of architecture. (Therefore the approach is a structuralist one, specifically it may be identified as structural-functional). Fundamental to this process is the articulation of all functions in the production processes and the building. The functions identified are the Symbolic, Climatic, Aesthetic, Political, Economic and Behavioural ones (SCAPEB for short).

4. A methodology is used that involves three distinct concepts: Architectural Function (as above), Housing (or architectural), Process and Housing Transformation (which has three dimensions: temporal, territorial and historical). Central to the explanation of architectural phenomena is the understanding of how production processes unfold into spatial organization and built form. Production and the product are approached as a continuum. Basic to the understanding of the housing problem is the study of housing transformations. These are analysed within and between housing processes.

5. An attempt is made to evolve a concept of 'housing mode of production'. Subsequently three modes of production have been chosen and dealt with in the thesis. One from 'primitive' societies and two from modern capitalist societies.

6. A concern for social architecture is stressed as well as the socialization of its production and product. Architecture should reach every social group, especially those which need it most. Therefore the objectives of the research have been to provide an alternative framework within which production and improvement of housing environments could be evolved. This is addressed to the lowest stratum of the population.

Various theoretical concepts are borrowed from several disciplines and authors. The formulation of the methodological approach used contributions from several sources. In particular the functional model used evolved from the original '4-function model' developed by B. Hillier, J. Musgrove and P. O'Sullivan (1972). This was developed further at the RIBA Intelligence Unit by B. Hillier and A. Leaman. Its transformation to the one used in this thesis is explained in Chapter 1. The development of some ideas rest on Jan Mukarovsky's work and also on the writing of several structuralists, especially Marxist ones. They are duly acknowledged throughout the thesis. However, the particular formulation of some of the basic concepts, the specific view of the thesis, its arguments and conclusions, are those of the author. Certainly many of these could not have evolved without the many valuable suggestions and criticisms made by Professor C.B. Wilson.

The effectiveness of the structural-functional approach is demonstrated in providing a comprehensive descriptive framework on the basis of which the housing problem and architectural phenomena can be characterized and explained. Inherently it allows emphasis to be put on the architectural functions within which it is sought

to achieve the objectives of research without losing sight of the dynamic totality of the particular housing process to which it is applied. In addition it demonstrates its problem-solving capacity within architectural praxis and gives an insight into other spheres of activity (e.g. politics and planning at local and regional levels). Consequently the gap between the various spheres of action which affect housing can be bridged. These issues are dealt with in the thesis but special attention is given to the relation between the mode of production and the resulting spatial form. The thesis does not consider specific issues of design practice nor is any attempt made to give a recipe for designers to design low-cost mass housing, since this procedure is precisely what is being criticized. Instead a framework is proposed (in Chapter 9) within which alternative production could be evolved. Of course it is implicit that by using this tool designers could get closer to the customs and real needs of users and generate appropriate design knowledge.

The thesis is divided into nine chapters. The first one describes the methodology used; the principles structuring the six-function model. Three of the chapters are case studies(Chs 3,5 and 6). These are formulated as descriptive models of particular housing processes; namely the 'primitive' architectural process, the Popular and the Government housing processes.

The case studies have been selected based on a typological ordering. This is the theme of Chapter 2 for 'primitive' societies and their architecture and Chapter 4 for the structure of the housing process and subprototypes in a modern capitalist society.

The description of housing transformations takes into account those

which occur both within and between the descriptive models. These are the theme of Chapters 7 and 8. Chapter 9 suggests that an alternative housing process for marginal groups is possible if certain principles are met.

At the end of each descriptive model there are tables containing the synthesis of each analysis. These have facilitated the study of housing transformations.

Each chapter is provided with a set of conclusions. Therefore in the section "General Conclusions" only those arguments which are complementary to the previous ones are outlined. Also a list of factors that affect housing processes and their transformation is provided.

The main arguments of each chapter are as follows:

CHAPTER 1 describes the principles upon which the structure of each one of the six functions rests. These functions of architecture are the Symbolic, Climatic, Aesthetic, Political, Economic and Behavioural. Production processes and the building (throughout space and time) is the core where all the functions are conveyed. Their structure identifies the various kinds of relationships existing between nature, society and building (process and object). This brings up the issue of the description of housing processes as being closely connected with its historically created meaning and social evaluation. The occurrence of architectural phenomena is context-bound. The relative autonomy and interdependency of the architectural functions is discussed and it is concluded that because of the difficulty in clearly limiting their domains, some conclusions

may be questioned.

CHAPTER 2 is concerned with the relationship between socio-economic processes and prototypes of 'primitive' architecture. Economic activities, especially the production or gathering of food and the central role of the kinship system, have a definite bearing on the production of physical structures as well as on the nature of the product. This can be portable, underground or permanent buildings. The 'primitive' architectural process takes place in a territory where the mode of production may be identified, according to Marxist thinkers, as primitive communist. Basic theoretical features of this are described.

CHAPTER 3 applies the theoretical 6-function model in order to describe and analyse 'primitive' architectural processes. It identifies the factors that influence production, spatial distribution and transformations occurring within these housing processes. Diverse data from two cultures, the Fali and Dagomba (Central West Africa) are examined and a single descriptive model is constructed and systematically analysed through its functions. It provides evidence which characterizes the architectural complexity and each of its blended parts as being ecologically balanced. Consequently, it explains and demonstrates that the intrinsic balance between nature, society and building (process and object) is expressed through the organic articulation of the architectural functions in the processes of production, the building and its use. Central to this is the co-terminality of the spatial structure with familial composition and transformation. Such transformations became the core of critical analysis of housing processes of modern societies

(Chapters 5, 6, 7 and 8). At the 'primitive' mode of production the socialization of production and particularly the distribution of space render equality and dignity to each member of society.

CHAPTER 4 describes the structure of the housing process and its sub-prototypes in modern capitalist societies. It argues that the interpenetration of socio-economic processes at various levels with the housing process causes the differentiation of housing patterns appearing in a mosaic-like urban environment, in addition to the mutual antagonism of the popular and the capitalist housing models of production and their housing process prototypes. The latter mode of production dominates the former. The characteristics of these as well as the capitalist mode of production in general are described. It is suggested in Chapters 2 and 4 that any housing production process or set of buildings can not properly be understood in isolation.

CHAPTER 5 describes and analyses the popular housing process through the methodological tools which are based on the structure of its own functions. These are the Political, Economic, Climatic and Behavioural ones. By using data from various squatter settlements and shantytowns (mainly from Lima and Mexico cities), a theoretical model is constructed within which constraints on the production and organization of space are identified. The dwellers' economy of subsistence and marginality determines the disordered articulation of the architectural functions in the housing process. There is evidence that dwellers, even when they have control of production and the product, rarely surpass certain basic conditions of habitation. The intervention of the State is limited to the granting

of private tenure and at some stage the provision of services. This on the one hand stimulates the mutation of physical structures into permanent ones, while on the other hand speculation is promoted, thus creating a further social stratification which is fostered by the increasing penetration of market relations, in production and exchange. Marginal groups prove, at the initial stages, to be very efficient through optimizing social and recycling waste masterial resources. Production is primarily use value oriented.

CHAPTER 6 constructs the third descriptive model. The Government housing process (in Mexico) is approached through the functions that it renders (the Symbolic, Climatic, Political, Economic and Behavioural ones). This housing process is affected by the centralization of decision-making structures as much as by the inter-penetration of the different fractions of capital, which the State to some extent represents and supports in its contention for profits. In addition, the various ideologies of the participants who control the process are also conveyed into the built form which is characterized by its minimum and rigid standards quite often contained in compact (sometimes tower) blocks. Dwellers become alienated because of their lack of participation in production, design and maintenance of their own dwellings. This housing process, whilst apparently consistent within itself, fails to articulate its functions organically and this has a considerable effect on dwellers. Production is primarily oriented to exchange value.

CHAPTER 7 explains the hierarchy of the architectural functions, changes in their structure and shifts in their performance within

and between the three housing processes investigated. Housing transformations from 'primitive' to modern societies are characterized by the changing values inherent in their functions. The primary transformation traced between the housing processes investigated is a shift in the emphasis in the performance of certain architectural functions. It is argued that there is a function performing in dominance as well as a counteracting one conditioning it, besides other functions playing a secondary role. It is stressed that the dominant function characterizes the housing process and determines the housing mode of production. This subsequently defines the structuring of the political function and the symbolic, economic and behavioural ones. Therefore the basic transformations subsequently analyzed in Chapter 8 take into account only these functions. Several dimensions of transformation are identified and defined here.

CHAPTER 8 discusses the changes occurring in the modes of production of housing, and within this, the transformation of social relations of production (from 'primitive' to modern societies) as far as they affect the production and organization of space and the transformation of housing over territory (urban-rural areas). It is argued that changes in the role played by kinship in the mode of production is one of the chief transformations traced from 'primitive' to modern societies. Particular to it is the shift in the multifunctional role of kinship and especially the dissociation of relations and forces of production and the implied changes in the modes of appropriation, labour process, etc. The labour force operating as merchandise fosters the dissociation of units of production and consumption. It is argued that the transformations of housing processes are affected from within the mode of production. This occurs almost in absolute terms in 'primitive' societies. But

also the housing process is affected from outside, this mainly happens in modern capitalist societies. Though many factors affect the process from outside the chief one has been identified as the content for the maximization of profits which is the primary function of the different fractions of capital operating within and outside the construction industry. It is suggested that changes in social structures and processes not only influence the structure of units and patterns of production, but they can also be traced in the transformation of the organization of space and patterns of built form. As a result, the performance of most of the architectural functions is subordinated to the economic function as well as to the political one. Thus the natural, latent, transformation of spatial order is constrained. In addition, antagonistic housing processes in the same territory are propagated.

CHAPTER 9 proposes an alternative framework to support the production of the built environment among marginal communities. Certain principles are introduced which would encourage the economic organization of the marginal groups into a sub-system in which collective ownership and management (of production in general and housing processes in particular) would predominate.

GENERAL CONCLUSIONS are complementary to those presented in each chapter; emphasis is put on methodological ones. Further research is suggested related to the methodology itself and strategies of its possible application.

CHAPTER 1

# RESEARCH METHODOLOGY. DEFINITION OF HOUSING PROCESS AND THEORETICAL ASPECTS OF THE 'SCAPEB' ARCHITECTURAL FUNCTIONS

## 1.1 INTRODUCTION AND RESEARCH OBJECTIVES

The field of enquiry of this dissertation is the architecture of housing and its production. A central question of the thesis deals with the problem of how a particular spatial form can be connected to the behavioural processes that produce it. Or what factors outside or within production determine the final spatial form. The proper investigation of questions of the production of space involves issues other than environmental, consequently resulting in an increase of logical complexity. To deal with issues emerging from the nature of architecture itself and the society that produces it, the basic concept will be that architecture is a process*; more precisely, architecture and housing will be seen as sets of built environmental structures and systems or simply as structured processes (see below).

To refer to the set of built environmental structures and systems as a unity, the term architectural process or housing process will be used. A housing process implies a beginning and an end or it might appear as open cycles. Obviously the housing process starts when the need for shelter or space emerges and then goes through several stages, generally identifiable with production and use, or building and dwelling.

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*John F.C. Turner (1976) and R. Fichter (1972) emphasized that housing must be dealt with as a process rather than as an object, meaning to include the activities involved in the production and use of houses. Turner identified the activities of planning, production, management and maintenance. Turner's approach neglects certain values and functions of architecture (which have been identified here) and his views are therefore bound to be partial and his concept of housing process is obviously different from the one proposed here. Turner's work has been taken into account in Chapter 5. References to it are acknowledged.

In order to understand and explain housing processes and their transformations within an organic totality, a structuralist approach is used. The use of a structural-functionalist* approach facilitates the analysis and description of the relationships between the built environment, nature and society.

Several aspects of housing processes will be dealt with simultaneously nevertheless;the degrees of objectivity and comprehensiveness will be determined by the main objectives of the research and the conceptual basis of the methodology used.

By studying comparatively the structuring mechanisms underlying various types of housing process, it is possible to produce a set of typological characteristics which allow any housing process to be easily identifiable.

With awareness of actual conditions of housing, in general, in terms of quality or inhabitability and theproblem of limited supply to an increasing number of low-income groups (especially in urban areas in developing countries), the chief aim of the research is to provide a descriptive framework within which alternative approaches to housing production and improvement could be evolved.

Is there any alternative to large scale production of housing, or to mass housing, in which quality would predominate instead of cheapness, or even more where quality and low-cost would not exclude each other?

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*This term refers to or comes from the identification of the functioning of the various structures analysed in an architectural process. It must not be confused with the sociological theory of the same name or also known as structural-functionalism, which distinguishes itself from structuralism, hence developed from functionalism in social anthropology.

In order to provide an alternative approach to housing production which would provide such characteristics it is first necessary to understand and explain the changes that occur in housing environments, and to identify the factors that affect any transformation taking place within and between housing processes.

In order to approach an architectural phenomenon comprehensibly, its functions must be identified. The concept of function is seen not in the traditional sense of architectural discourse but in a scientific or structuralist sense. An architectural process is composed of structures of various kinds. These structures are concepts formulated as architectural functions.

> "The functional view permits us to conceive things as events without denying their materiality. It shows the world simultaneously as motion and as a fixed basis of human activity."*
> (Jan Mukarovsky, 1977, p. 236).

The idea of looking at architecture through the functions it renders is not new. The concept as used in this thesis has been adapted from various sources: from Jan Mukarovsky (1977) who brilliantly spells out a structuralist approach to the functions of Art; as well as from several structuralist movements, especially from Marxism; then from anthropology, linguistics and economics among others. Also, and primarily, the concept of function has been adapted from B. Hillier and A. Leaman (1972, 1974a, 1974b) and B. Hillier, J. Musgrove and P. O'Sullivan (1972) who formulated a theoretical model of architecture based on its functions. Its foundations and purposes are understood

*'The concept of function' in J. Mukarovsky (1977) is concerned with the relation of the work of art to the perceiver and to society. He does not relate it to the production of it.

to be the following:

## 1.2 THE 'FOUR-FUNCTION MODEL'*

B. Hillier and A. Leaman (1972, 1974a and 1974b) and Hillier et al (1972) asserted that research is capable in the long run of affecting the ways in which problems are pre-structured by designers. On the basis of understanding research simply as a service to design, a study was made in order to explain how design is possible (1974a). Several times they suggested that in order to contribute to architectural practice, research should keep away from the study of design methods and concentrate on the study of buildings and their occupants. Such studies would provide the designer

> "... with a stronger theoretical, operational and heuristic basis from which to conjecture, rather than in terms of knowledge to determine outcomes."
> (Hillier et al, 1972, p. 1).

In this way the designer could make use of a code to pre-structure a design problem. At the same time it was understood that the main concern of architecture is the dynamic and relational aspect existing within its own phenomenology.

> "... the chief interest to environmental and architectural science are certain kinds of relations which are in some sense mediated or modified by environmental change."
> (B. Hillier and A. Leaman, 1974b, p. 6).

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*The concept of function and the four-function model of architecture appeared in a paper by B. Hillier and A. Leaman entitled: 'A New Approach to Architectural Research', in December 1972. It also featured in 'Knowledge and Design', a paper by B. Hillier, J. Musgrove and P. O'Sullivan which was published in the proceedings of EDRA/3 conference, April 1972. Following papers by the former authors (1974a and 1974b) develop the idea further.

These views led B. Hillier and co-authors to consider the scientific concept of function and attempt to define in theoretical terms what a building is and what environmental forces act upon it. Then reference was made to the Man and environment relationship which was identified to have an elaborate structure which they presumed to have within their nature, a code which is essential to designers.

> "A designer uses such a code that expresses the connectivity between (human) needs and artifacts in order to make useful and viable links between the two domains."
> (Ibid, p. 5).

Taking this into consideration, the man-environment relationship was pulled apart and the man-building was defined as:

> "... a realisation of a number of social functions with an effect of ecological displacement."
> (B. Hillier et al, 1972, p. 21).

The 'four-function model' identified the building as a behaviour modifier, a climate modifier, a symbolic modifier and a resource modifier.

> "Each of these functions can be expressed as a relation. The first is a relation between behaviour and spatial structure which is mediated by building; the second is a relation between human psycho-physiology and the natural environment, mediated by building; the third is a relation between the physical artefact as a sign and its symbolic meaning, mediated by building; and the fourth is a relation between the use of resources and goals, mediated by building. These relations are in effect realisations of a more basic set of relations. The matrix [see Fig. 1.1] gives a straightforward version of the structure of these more basic relationships. The columns represent the basic categories - the relation between <u>man and nature</u>, and the mediation between <u>man and man</u> which are ubiquitous in all forms of the artificial environment; and the rows represent how buildings function both in a visible, tangible way (buildings as things) and in a less obvious but pervasive

way as a cultural language (buildings as signs). The boxes of this matrix yield the four-function model."
(B. Hillier and A. Leaman, 1974b, p. 7).

| | MAN-NATURE relation | MAN-MAN relation |
|---|---|---|
| Buildings as THINGS | Climate Modification Function | Activity-Space Function |
| Buildings as SIGNS | Economic Function | Social Language Function |

Figure 1.1 The 'Four-Function Model' (as proposed by B. Hillier and A. Leaman, 1974b, p. 12).

The theoretical model of an architectural process as used in this thesis contains six functions, four of them being similar to those identified by the authors referred to above. The 'four-function model' has been reinterpreted and modified. Basic differences between both theoretical models are found in the use of certain concepts as well as in their application*.

Every function of architecture has its specific structural traits. Architectural functions are identified as dimensions or fields of the environment which shape the built form, spaces and physical structures,

*A critical analysis of both models could be a lengthy subject to study, especially because such comparison must involve other relevant structuralist views, namely the works of A. Awadalla (1979), T. Maravelias (1978a and 1978b) and T. Kotsiopoulos (1978 and 1980). Similarly, the two functions added (namely the Aesthetic and the Political ones) are not a simple derivation from the four function model. Many factors influence their incorporation. This takes into account ongoing discussions by many authors on the housing problem in developing countries, and also various aspects of the orientation given to both the approach and the research strategy.

and also define the mode of building. Architectural functions are seen statically, fixed in time and space, and dynamically as they change over time and place. These functions are relationships between 'elements' and which the building object and/or its production process mediate their connectivity. The architectural functions are identified in this thesis as the Symbolic, Climatic, Aesthetic, Political, Economic and Behavioural ones.

The fact of identifying two functions of architecture other than those of the 'four-function model' of a building, allows us to identify and evaluate* clearly and comprehensively all factors that have an effect on architecture. Consequently we stress that architecture is more than shelter. Precisely because the aesthetic function that architecture renders contributes to such qualification (see Section 1.5). By identifying the political architectural function it is clearly understood who or what controls the housing process and how it is affected (especially in the production of mass housing - see Section 1.6 and Chapter 6).

The six functions of architecture identified in this thesis (the Symbolic, Climatic, Aesthetic, Political, Economic and Behavioural ones) are the points of departure in undertaking this research, and describe and analyse the architectural processes presented here. The identification of the structure and characteristics of each architectural function is made below.

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*See the evaluation of each housing process and their transformations, Sections 3.6, 5.6, 6.6 and Chapters 7 and 8.

(continued from previous footnote)The basic difference between both sets of functions is conceptual; while Hillier's (et al) model put emphasis on the building which mediates the structure of the functions, the model used here considers both the production processes and the building. See below the conceptual basis of each function.

## 1.3 THE SYMBOLIC ARCHITECTURAL FUNCTION

This is a relation between the physical product as a sign and its symbolic meaning, mediated by building and the processes that produce its form.

> "As a symbolic modifier* the building functions, not only in terms of the designer's intentions, but also in terms of the expectations and awareness of those who experience it. In this way the building has a similar displacement effect on societies' symbolic systems as a whole."
> (B. Hillier and A. Leaman, 1974, p. 8).

To understand this relation we must refer to levels of semiological representation and awareness. Settlement or building images in terms of the overall form, architectural spaces and elements within them are pregnant with meaning at various levels**and therefore compose a particular architectural language that may change at different places and times.

The evoked images may be intended or not, and they may emerge within or outside the architectural praxis. As a general rule unintended meaning has its origin outside the housing process (e.g. squatters housing, especially in shacks - Chapter 5).

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* Although the building is being referred to as modifier of its own function, there is a reciprocal action between elements of the function, and the building, therefore it acts both in relative terms, as modifier and modified.

**For instance,a door acquires its meaning in relation to the space that connects, or in relation to itself in terms of size and material which it is made of; for studies emphasizing semiological properties of architectural elements (such as staircase, door, window, etc). See for example, Eco (1972). Other levels of semiological representation are found in the space and its functions; also at the level of the building, (for concern over the nature of whole buildings see, for instance, Jencks and Baird (1969); Norberg-Schulz (1963)); groups of buildings or at the settlement level. For examples of this level see, for instance, Kevin Lynch (1960) "Image of the City". His approach is based on the communicative value of built form within which its "environmental image" is composed of three elements; "identity", "structure", and "meaning". See also Lagopoulos (1975).

Architecture as a symbolic modifier, at a particular historical moment and place, is determined by society's cultural system and its technological and organizational modes. Thus meanings bring into play the process of production with its inherent ideological forms and contents. This shows the autonomy and interdependency that each function may have with each other. The symbols expressed in buildings differ according to the builder's or designer's intentions; they may be explicit or well dressed with ambiguity and contradiction (as discussed by R. Venturi, 1966).

## 1.4 THE CLIMATIC ARCHITECTURAL FUNCTION

This is a relation between human physiology and the natural environment, mediated by building. B. Hillier and A. Leaman stated that a building functioning climatically has the following characteristics:

> "In functioning as a climate modifier the building acts as a complex environmental filter between inside and outside, modifying (by decreasing, increasing, selecting, specifying, etc) the sensory inputs into the human occupants, and also having displacement effects on the external climate."
> (B.Hillier and A. Leaman, 1974, p. 8).

Building elements act as barriers (e.g. walls, roofs, etc) and/or channels (e.g. windows, doors, ducts, etc) to the physical variables of climate, therefore modifying the climatic fields:

> "By creating a wall we modify the various climatic fields such as wind, temperature, radiation, humidity, precipitation, etc."
> (Awadalla et al, 1976, pp. 37-75)

As a result the operation of barriers and channels is multifunctional

in character, not only because each building element may modify various climatic fields but also because it certainly has other purposes. The same wall for instance might function as a bearing element and a space partitioner. Thus the climatic function interlocks with other architectural functions in various degrees.

In any solution the climatic function interacts with the economic function and decision-making structures (this is described in Chapters 3 and 6), thus having an effect on space-use activities and the behaviour of users. The question follows: to what extent does the climate influence the shape of the building and the internal spatial distribution in relation to other architectural functions? The descriptions in the case studies attempt to explain the process by which climate modification is achieved (see Sections 3.3, 5.3 and 6.5).

## 1.5 THE AESTHETIC ARCHITECTURAL FUNCTION

The aesthetic function in architecture is a relationship between human perception, through a contemplative experience, and recognizable symbolic meanings, mediated by the building and the nature of its space and content.

The notion of an aesthetic attitude is commonly held to be

> "a style of perception concerned neither with the factual information to be gained from the things perceived, nor with their practical uses, but rather with the immediate qualities of the contemplative experience itself."
> (Anthony Quinton in A. Bullock and O. Stallybrass, 1977, p.10).

It is implied that works of art, in this case architecture, are human productions designed to reward this kind of attention.

If aesthetic perception is not immediately linked with the factual information nor with the practical user or activities performed in space we can say that it has an independent existence. It is above the other five functional relations (Symbolic, Climatic, Political, Economic and Behavioural) and yet is is affected by them. In this sense we can speak of aesthetics as a metafunction. In reality our sensual perception is conditioned by our moral attitudes as well as by other states of mind induced by previous experiences or by the immediate characteristics of the architectural reality. Also when reason interferes in our judgements certainly the perceptual quality itself and thereafter the description of it may suffer distortions.

The aesthetic architectural function is implicit in the description of the housing processes studied but has not received the same attention as the other functions of architecture to which reference is made*. Consequently this dissertation does not deal with the transformation of the aesthetic function in housing. Some of the issues involved with it in relation to other functions are brought up in Chapter 7.

Architecture is multifunctional. All its functions are potentially omnipresent, but the omnipresence of the aesthetic function in

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*The study of the transformations of housing processes involves the analysis of the transformations of mainly three architectural functions, namely the Symbolic, the Economic and the Political. In parallel, the Behavioural function is taken into account. See Chapter 8.

architecture is particularly prominent*.

The aesthetic function appears in architecture as something added, something coming from outside. It tends to be found on the surface of buildings, in space, in details; at every morphological level we find the components functioning as aesthetic factors. The aesthetic function in architecture changes everything that it touches into a sign. Therefore it is closely connected with the symbolic function. In order to understand the difference between the Aesthetic and Symbolic functions a brief reference to their characteristics will be made below.

In the Aesthetic architectural function the subject (the user of architectural space) dominates the interaction with the object (the building;space) through the perception of signs which are attached to various levels of the built form. In this case the subject only experiences space without immediately or directly affecting its transformation. The aesthetic architectural function deals more with the process of perception of the sign. This then becomes the domain exclusively of the observer.

> "... the only reality to which the aesthetic sign refers is the reality of its perceiver."
> (Peter Steiner in Mukarovsky, 1977, p. xxxiii).

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*The notion of the aesthetic function and its existence or maximal exclusion in housing and other buildings allows us to distinguish between works of art - architecture-and ordinary buildings. The aesthetic function is fundamental to art-architecture. It contributes to highlight the artistic qualities of buildings. The aesthetic function contributes to identify a good performance of architecture and often qualifies it as art-architecture. Though for this it is necessary to include an evaluation which would consider all functions of architecture. For a theoretical distinction between art and non-art see Jan Mukarovsky (1977) who gave an explanation to this philosophical question. He facilitated the bridging of the gap between art and non-art.

Jan Mukarovsky (1977, p. 21) pointed out that

> "Only in the case of the aesthetic function does the major emphasis lie in the sign itself, in that sensorily perceptive thing which acquires the task of signifying something or referring to something."

Accordingly, the most important element identifiable within the Aesthetic architectural function is the aesthetic sign, as distinct to the symbolic one. While the aesthetic sign exists within the domain of the subject that is within the contemplative experience of the observer, the symbolic sign is attached to the object, in which case symbols and intended or acquired meanings are part of the physical structure, e.g. main doors, ornamental and bearing columns, space or building to house a particular activity. Both types of signs have their values in themselves, their values function as meanings. Aesthetic and symbolic values strongly interpenetrate. Nevertheless, the aesthetic value is quite distinct in itself; here the notion of process also has a direct bearing on the semiotics of art and architecture:

> "Whereas all other values primarily emphasize the result of evaluation, aesthetic value foregrounds the act of evaluation."
> (J. Mukarovsky, 1977, p. xxxii).

There follows an identification of the sign and value of the symbolic function in which case it is necessary to refer to its domain and structure. Both symbolic and aesthetic architectural functions exist in a hierarchy of subject and object in a functional interaction. In the symbolic architectural function the object dominates the interaction with the subject.

> "... and the functional thrust is toward affecting reality, either directly or through the mediation of signs which are in an effective relationship to this reality."
> (Peter Steiner in J. Mukarovsky, 1977, p. xxix).

In the case of the symbolic function the object is in the foreground:

> "In this case attention is focused on the effectiveness of the relation between the symbolized thing and the symbolic sign. Either reality is affected by means of the sign, or reality operates by means of the sign; both the sign and the reality represented by it, then, appear as the object. This effectiveness of the relationship between the sign and the thing designated by it is therefore a fundamental and indispensible feature of a symbolic sign. Wherever it is missing, the symbol turns into an allegory. Let us take a sign (of a state, for example). Insofar as there is a causal relation between such a sign and the thing - for example, such that an affront to the sign is an affront to the state, the sign is a symbol. If this property is lost, the sign becomes an allegory such as so-called conventional symbols (heart - love, anchor - hope). The symbolic function therefore foregrounds the object."
> (J. Mukarovsky, 1977, p. 41).

## 1.6 THE POLITICAL ARCHITECTURAL FUNCTION

The Political function in housing and architectural processes is a relation between 'agents' of control, acting within particular decision-making structures, and objectives mediated by building and processes that produce and transform its form.

One of the elements of the Political function that acts as modifier is the controlling 'agent' which influences directly or indirectly built form, dwelling space or building process and more than one type of 'agent' might operate in each case. For instance, agents of control(in the case of the Popular and Government housing processes - Chapters 5 and 6) are related to distinct kinds of cultural codes.

In the former housing process, traditional urban patterns influence the spatial structure; in the latter regulations exert particular control over production and spatial issues. Thus the domain of this function overlaps with the other architectural functions. The most important of all 'agents' of control is the actor that makes decisions. The actor taking decisions may guide its decisions based on the other agents, though these might be determined by objectives inherent in the various functional levels. Thus the objectives set by the actors to control production and the product, the house(s), are of various kinds. The relation actors-objectives has a definite effect on the mode of building and determines in general the nature of the building, therefore affecting the other architectural functions. In this sense if certain objectives have priority, they receive more attention. Consequently any other function might predominate (see Chapter 7).

Actors operate generally within a structure of decision-making. This may be an organised body, enterprise, institution or production unit. The actors' decisions affect the production and organisation of space. The housing process functioning 'politically' affects the various levels of spatial configuration; it also acts as a political modifier (since it transforms the relationship actors-objectives) of a complex relationship between the production and organisation of space and social structures in general. Consequently, the political function of housing processes has displacement effects on the social relation to space in the society as a whole. That is, the totality of housing processes acts as an arena for political confrontations.

## 1.7 THE ECONOMIC ARCHITECTURAL FUNCTION

The Economic function in architecture and housing is a relation between actors, use of resources and goals, mediated by building and especially by its production processes.

B. Hillier and A. Leaman (1977, p. 8) noted some general aspects of the building functioning economically:

> "As a resource modifier the building functions in transforming existing patterns of use value ..."

But also the production processes act as resource modifier, thus functioning in equal terms with the building. Both production processes and the building function under capitalism transforming existing patterns of exchange value. Both add to the value of raw materials, act as capital investment, redistribute scarce resources of manpower and material over space and time:

> "... and in a less measurable way [the building] adds to the existing use value of the building stock." (B. Hillier and A. Leaman, 1974, p. 8).

The economic function in housing and architecture constitutes the structure of relationships existing between actors (which perform a role and have certain objectives in relation to sets of operations - resources (labour process) and transitional or final products). These structures of relationships change in space and time. The specific characterisation is acquired according to the particular kind of interaction of forms of ownership (or property, and control, that is

the political function of architecture) over:

1. instruments of labour (e.g. direct use of hands, shovels, building machinery);
2. labour process (identifying real appropriation and/or separation of means of production and wage labour);
3. the object of labour (land, materials, transitional or end products, e.g. the building). (See L. Althusser and E. Balibar, 1970).

These structures give rise to the form of production cooperation and structure of the unit of production, therefore identifying a particular mode of production (of which three have been identified and dealt with in this thesis. They are inherent in the 'primitive', popular and government housing processes). Inborn in these socio-economic processes is the creation of use-value attached to the transformation of materials, transitional and end products. But also under specific circumstances the creation of exchange-value emerges in the process. These issues of value always exist or are potentially present in production, consumption or transformation of housing processes*. There therefore follows a brief definition:

> "... Value ... seems to be a property of things."
> (I.I. Rubin, 1972, p. 63).

> "Production is always social. It is always 'the appropriation of nature by the individual within and through the mediation of a definite form of society'**,even if the individuals at first pursue their private labours independently of each other. The use-value of the things produced by them is realized without exchange 'by means of a direct relation between the objects and man'."*** (A. Schmidt,1962, p. 68).

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* These issues of use-value and exchange-value will be brought up especially in the description of the transformation of housing processes, Chapter 8.

** Karl Marx, 1913, p. 273. 'On the social determinacy of all appropriations of nature by man';see also Wage Labour and Capital, MESW, Vol. I, pp. 89-90.

***Karl Marx, Capital, Vol. I, p. 83.

> "... for Marx use-values are combinations of two elements, the stuff of nature and the labour which shapes it." (A. Schmidt, 1962, p. 74).

In addition, in the act of production, the relation subject-object involves one of interpenetration of use and (potential) exchange value. Through the mediation of labour the transformation of materials occurs until they acquire a final structured spatial form: a house. The use-value is acquired through the labour process (sets of operations/resources), but under special conditions in the same process it is created an exchange-value. Therefore the transitional or final products become a commodity. Thus a question arises: when does a product acquire commodity status - in the actual act of exchange, or along the housing process when it is perceived as a commodity?

Rod Burgess (1978/79, p. 130), referring to this issue in housing, asserted:

> "An object of human labour can only acquire the status of a commodity under the social conditions of private property, division of labour and exchange."

Under these conditions exchange-value is derived from the labour time spent on the elaboration of the building product. The discussion need not be extended*, but is important to identify the existence of use-value in the economic function of architecture wherever the housing process takes place.

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*For further elaboration on the subject refer to its original sources: Karl Marx, Capital, Vol. I and II; see also Alfred Schmidt, 1962, pp. 63-93.

The information contained within the economic architectural function for every housing process that will be analysed is organized in the following way: the description is arranged to identify the various operational factors, e.g. technical knowledge, subject of labour, means of labour (or instruments), set of operations within a frame of building production stages. The organisation of work is also considered; e.g. the organising principle, characteristics of the production unit, division of labour and form of co-operation.

Finally, property relations or forms of ownership will be taken into account. This aspect is closely related to the forms of control described under the political architectural function. Thus the domain of both architectural functions overlap in certain aspects. The above information next to the forms of control will lead us to identify the mode of housing production (of which general characteristics are described in Chapter 4 for housing processes occurring in a territory where the capitalist mode of production dominates), the labour process and the orientation of production, e.g. use-value and exchange-value.

## 1.8 THE BEHAVIOURAL ARCHITECTURAL FUNCTION

This is a relation between the behaviour of users and the spatial structure which is mediated by building.

> "As an activity modifier, the building inhibits some activities and facilitates others, perhaps prompting or determining them. It also locates activities within a broader ecological framework and constitutes a modifier of the total behaviour of that part of society that comes into contact with it."
> (B. Hillier and A. Leaman, 1974, pp.7-8.

The Behavioural function of architecture deals with the practical uses or activities performed in space. Its functioning can best be identified and qualified by looking at the spatial organisation of the building in relation to the activities performed within it. The use-activities to some extent determine the shape and/or the size of space and the building in general. The reverse may also be true; the strict physical limits of spaces or their arrangement may constrain the performance of the activities, not deterministically but suggesting an inevitable adaptation (as is the case of families living in one room houses, Chapter 5). Or else, space acting as a signifying framework of man's activities may enhance cultural patterns of behaviour (as in the case of the 'primitive' architectural process, Chapter 3).

Perhaps the domain of the Behavioural function can more easily be demarcated since its boundaries often correspond to specific physical barriers. Nevertheless to identify the factors that shape the boundaries of activities and space suggests an interpenetration of various functions. Therefore the description of this function of architecture deals not specifically with each activity (individual, group, private or public) carried out in the housing prototypes investigated but the analysis of activities is implied in parallel to the description of other architectural functions. The overlapping of the Behavioural function with other functional domains is not constant; the domain of the functions changes depending on the context, on the culture; the ways of eating, cooking, sleeping, taking place have cultural behavioural characteristics that modify or adapt its immediate place/space where they are performed. The constraints of use-activity by the physical space or its contrary effect - that is the determination of size, shape and

spatial arrangement by activities, bring about the issue of value of the Behavioural function. This value emerges from the 'level of performance' of use-activities within the building. It is the performance of space in relation to the customs of users. The Behavioural value is acquired according to the fulfilment of cultural spatial needs of the users. An optimum Behavioural value may accommodate personal as well as group space preferences in order to foster individual and social patterns of behaviour.

## 1.9 THE FUNCTIONS OF ARCHITECTURE AND THEIR SOCIAL EVALUATION

Housing processes perform a number of functions that have effects on the community as well as on the physical-ecological environment. The architectural functions acquire their character in the context where the housing processes take place.

The theoretical six-function* model of architecture refers to the Symbolic function, the Climatic function, the Aesthetic function, the Political function, the Economic function and the Behavioural function. These will be referred to collectively as the 'SCAPEB' architectural functions.

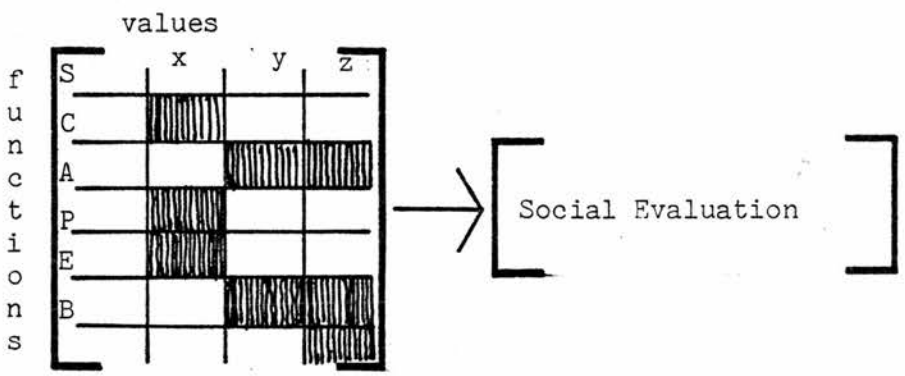
The 'SCAPEB' functions of architecture change over time. Transformations occurring within and between housing processes will be a subject of description in this thesis. The qualities, in general, of the

*Any number of functions may be attached to architecture. This would depend on the purpose of the evaluation. For instance building statics may be very important in shaping the building, and it has been briefly considered here within the description of the Economic function. But if statics strongly influence the building form, it would deserve equal functional treatment, though its explicit incorporation in a research process would be determined by the objectives of the research.

functions of architecture and the approach to the organisation and production of space have been accumulating historically. So the architectural functions define more or less, through social evaluation, what buildings are at that point in time.

Housing and any other type of building has a variety of degree of quality and performance. An ordinary building may have a low quality and performance of its functions; society decides about it but also a special contribution is made by those who share an architectural culture. Housing in general is evaluated taking into consideration its (architectural) functions, but also these are considered, implicitly or explicitly, by builders and all those participants of the housing processes. Functions might also be an effect of actions occurring outside their processes themselves (Chapters 8 and 9). Thus the functions of architecture become incorporated in both ways: intentionally or as a by-product.

The SCAPEB functions are in one way or another potentially measurable; objectively or subjectively. This presupposes the existence of some value system against which we can measure them. This should imply a community's preference, because in general, the awareness of the functions is part of the culture. Thus the architectural functions imply a community's evaluation.



Casual observations teach us that people value buildings and the built environment in different ways depending upon whether they are producers or consumers. Within architectural processes people's intentions are more or less defined by their roles and value system. Each function may be approached for its evaluation; by identifying its performance as well as the quality of its objectives, with a particular yardstick. So in some way the participants in the architectural processes set their preferences and weightings.

## 1.10 SUMMARY AND CONCLUSION

Housing processes are multifunctional. Any housing process performs a number of functions. A theoretical model for their analysis has been constructed. It contains six functions of architecture which collectively are referred to as 'SCAPEB' architectural functions. These are the Symbolic, Climatic, Aesthetic, Political, Economic and Behavioural functions. As conceptual research tools, the 'SCAPEB' architectural functions have been used to provide the theoretical framework within which the description, analysis and synthesis of housing processes and transformations have been carried out.

The Structural-Functional approach presented here suggests its effectiveness by providing a comprehensive descriptive framework on the basis of which housing can be appropriately characterized and explained. Inherently it allows emphasis to be put on the architectural functions within which it is sought to achieve the objectives of research without losing sight of the dynamic totality of the housing process.

Every function of architecture has its particular structural traits. Architectural functions are identified as fields or dimensions of the environment which shape the built form. Reciprocally the building acts as modifier of its own functions. This is so partly because the architectural functions are relationships between 'elements' and these are mediated by the building object or production process or both. The specific structure of each one of the 'SCAPEB' architectural functions has been identified, as follows:

The structure of the Symbolic function is a relation between the physical product as a sign and its symbolic meaning, mediated by the building and the processes that produce its form. The building functions as symbolic modifier through manifesting the designer's intention, fulfilling expectations and increasing awareness of those who experience it.

The structure of the Climatic function is a relation between human physiology and the natural environment, mediated by the building. The building functioning climatically acts as a complex environmental filter between inside and outside, modifying the sensory inputs to the human occupants.

The structure of the Aesthetic function in architecture is identified as a relation between human perception (through a contemplative experience) and recognizable symbolic meanings, mediated by the building and the nature of its space and content. The building functions aesthetically when it rewards aesthetic experience to its occupants.

A distinction has been made between the aesthetic and symbolic functions of architecture. The domains of both functions interact in an object-subject relation. While the aesthetic function is attached to the subject (observer) and is present before any evaluation, the symbolic function is attached to the object (the building) with precise identifiable signs and meanings.

The structuring of the 'Political' function in housing has been identified as a relation between 'agents' of control (acting within particular decision-making structures) and objectives mediated by the building and processes that produce and transform its form. Housing processes functioning 'politically' affect the various levels of its spatial configuration and affect, to some extent, social relationships and processes existing outside and within it.

The Economic function in housing and architectural processes can be identified with several structures. In principle it is a relation between actors, use of resources and goals, mediated by building and its production processes especially. The economic structures give rise to the form of production cooperation (labour process) and structure of the unit of production, therefore identifying a particular mode of production. Three modes of production of housing have been identified and dealt with in this thesis. They are inherent in the 'Primitive', Popular and Government housing processes. Economically speaking, the building and the production processes act as modifiers of resources (human and material), transforming especially patterns of use and exchange value (when applicable) over space and time.

The structure of the Behavioural function has been identified as a

relation between the occupants' behaviour and spatial structure which is mediated by building. Its functioning can be understood by analysing the spatial organisation of the building in relation to the activities performed within it. The building acts to a limited extent, both as the modifier of and as the object modified by the use-activities.

All processes involved in the transformation of the built-environment taken together are social effects on the ideology* produced by a social relation to space. Thus morphological processes, since they contain social evaluations, are determined by historical events which occur also outside architectural praxis. The description of architectural and housing processes is closely connected with its historically created meaning and social evaluation. This is taken into consideration. Nevertheless what is important for us is to recognize the evaluation made by many of those sharing an architectural culture. As part of that aim the research tools used are characterized by their interdisciplinary concern. The comprehensiveness of the 'SCAPEB' functions allows us to incorporate various disciplines in order to elucidate the description and arguments involved in the analysis and comparison of different housing processes.

It is certain that some of the 'SCAPEB' architectural functions may appear more relevant than others. There are priorities in every circumstance and a subordination of some functional considerations to others seems to be unavoidable. This theme is central to Chapter 7.

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*In this case a dominant ideology. See Section 6.2 for the case of several ideologies merging into the housing process.

Taking the above into account, an analysis of the transformations of housing processes is the subject of inquiry of Chapters 7, 8 and 9. The description of housing transformations is made within and between the descriptive models; namely the 'primitive' architectural process, the popular housing process and the government housing process.

The structural-functionalist approach proposed is characterized by its comprehensiveness, objectivity and its multidisciplinary basis making it able to be used for describing complex architectural and housing processes. Operationally it can be advantageous to use it in order to organise their social and economic structures and to design and build their physical ones. The application of the methodology to the case studies and in the thesis in general suggests its usefulness and validity. To trace the demarcation of boundaries of each function's domain presents problems for description and analysis, in which case certain conclusions must remain as hypotheses.

The case studies of housing processes have been selected following the identification of certain typological orderings. The three housing processes which are presented belong to two distinct contexts. The 'Primitive' architectural process takes place in a territory where the mode of production may be identified as primitive communist*. The Popular and Government housing processes take place within a territory where the capitalist mode of production dominates. For each context an attempt will be made to identify housing process prototypes. This is the theme of Chapter 2 for the former context and Chapter 4 for the latter.

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*According to Marxist thinkers, for instance B. Hindess and P.Q. Hirst (1975), C. Meillasoux (1969), E. Terray (1972) and M. Godelier (1972).

CHAPTER 2

# THE STRUCTURE OF ARCHITECTURAL PROCESS PROTOTYPES IN 'PRIMITIVE' SOCIETIES

## 2.1 INTRODUCTION

In order to classify prototypical architectural processes in 'primitive' societies, the following points have been taken into consideration. The nature of economic activities, especially the gathering or production of food, and the social structures (particularly the kinship system) have a definite bearing on both the production of physical structures and the product. These factors determine the characteristics of the architectural process. Hence, three architectural process prototypes have been identified and their general characteristics described.

## 2.2 SOCIO-ECONOMIC PROCESSES AND PROTOTYPES OF 'PRIMITIVE' ARCHITECTURE

In order to understand the nature of the typical example of 'primitive' architectural processes that are going to be described in the following chapter (3), a classification of 'primitive' architecture will be proposed.

Primitive architectural processes are associated with 'primitive' societies. These societies are those which almost until the present day, have remained outside the large, highly organized political and economic entities which predominate in the organization of the modern world. That is to say 'primitive' societies have not been integrated

with, nor are a result developed from, modern states. Anthropologists have made a further distinction that characterizes their social organization. Kinship, which is biologically determined, is dominant in 'primitive' societies (see, for example, Levi-Strauss).

The dominant role played by kinship is extended to all economic and cultural activities; therefore affecting the organisation of production and distribution which identifies the mode of production, in Marxist terms, as 'primitive communist'*. This, in general, has the following characteristics:

> "... primitive communism as a mode of production characterized by a collective appropriation of surplus-labour merely specifies (1) that there are no classes, no state and no politics, and (2) that the mode of production consists of the articulated combination of the economic and the ideological levels."
> (B. Hindess and P.Q. Hirst, 1975, p. 41).

> "'Primitive communism' ... is characterized by a very limited development of productive forces and a limited division of labour."
> (B. Hindess and P.Q. Hirst, 1975, p. 43)**.

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*For a complete description and analysis of this mode of production in a specific context see C. Meillasoux in Terray (1972), and for a theoretical conceptualisation of the 'primitive communist' mode of production see B. Hindess and P.Q. Hirst (1975). They define it, based on Marxist principles, as follows:

"A mode of production is an articulated combination of relations and forces of production structured by the dominance of the relations of production: the relations of production define a specific mode of appropriation of surplus-labour and the specific form of social distribution of the means of production corresponding to that mode of appropriation of surplus-labour."
(B. Hindess and P.Q. Hirst, 1975, pp. 9,10).

In the primitive communist mode of production the surplus-labour is appropriated collectively.

**The production of huts shows these characteristics among others. See the economic architectural function of the 'primitive' architectural process, Chapter 3.

The above implies that there is not a political level as it exists in other types of modes of production (i.e. capitalist) or social formation. This in turn emphasizes the role of the kinship system* which in general constrains the possibility for technical advancement but nevertheless provides the basis for the reproduction of the system. (B. Hindess and P.Q. Hirst, 1975, p.51).

In 'primitive' societies kinship dominates social life. The kinship relations determine the rights of individuals to the land and its products, their obligations to cooperate among themselves and for others either to receive or to give.The dominant role of kinship relations in political and religious matters is obvious since they determine the authority of certain individuals over others.

The complexity borne by kinship relations relates to the multiple functions they take in such societies. Kinship plays a determinant role alongside the economy as well as being very important as a symbol of the community**. M. Godelier (1972) expresses it as follows:

> "In an archaic society kinship relations <u>function</u> as relations of production, just as they function as political relations. To use Marx's vocabulary, kinship relations are here <u>both</u> infrastructure and superstructure." (M. Godelier, 1972, p. 364).

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* The role of social relations in the mode of production becomes one of the key elements in understanding the relationship between architectural phenomena and the economy. The mode of production of the system as a whole affects the various housing transformations in quite a different manner whether the system is primitive communism or capitalism (see Chapters 3, 5, 6 and 8 especially). Hence the importance of identifying the system with the different modes of production involved (of building and otherwise). The description of their particular characteristics and their mechanism are outside the scope of this thesis, yet an attempt will be made to deal with the housing or architecture mode of production as being part of or linked to other socio-economic processes. See below and Chapter 4 which attempts to explain the relationship between socio-economic processes and housing processes under capitalism.

** This is particularly clear in its manifestation in the spatial configuration of the primitive architectural processes. See Figure 3.1.

In primitive societies, the social processes and underlying mechanisms* operating within what covers the relationship between architecture and the economy, in general, characterizes the structure of 'primitive' architectural processes. Economy is a process of provisioning society, is the material life process of society (M. Sahlins, 1972). The 'economic activities' of 'primitive' societies have been identified as follows: hunting; agriculture; animal husbandry; fishing; gathering; and handicrafts. The production and maintenance of huts fall under handicraft activities (see J.P. Lebeuf, 1961; L. Prussin, 1969; and C. Meillassoux, 1964 in E. Terray, 1972, especially). We can also refer to hunting, gathering or herding economies.

Three linked traits identify each architectural process; they are (1) the building process; (2) the shell or architectural product; and (3) the nature of the chief economic activity of the community as a whole, in this case the production of food. These associations can easily be discovered once we understand the relation of built form with society in 'primitive' settlements. Thereafter the order existing between the 'primitive' architectural patterns will be understood. Briefly, we can identify two types of activities related to the production/acquisition of food in primitive societies:

The activities of Nomad (Band) societies take the form of food gathering. Here, hunting is often found to be the chief activity. And we can also refer to a society of gatherers or hunters. Herding or fishing could also be considered activities of the Nomad people. Within their activities kinship systems determine their organisation

*e.g. labour process, and modes of appropriation, exchange and distribution of the products.

and patterns of authority. The forms of nomadism differ widely the world over*. Nevertheless, certain geographic conditions characterize them. Among them are the dryness of the land and subsequent lack of water.

> "Whether the land be Arctic tundra, taiga forest, steppe, or desert, the lands of the nomads are dry." (T. Faegre, 1979, p. 4).

Due to the rapid exhaustion of resources, whether the activity is seasonal (e.g. hunting) or periodical and continuous (gathering, fishing and herding), the settlement must be located wherever necessary. Therefore it must be mobile. The nomad spends a great deal of time living and working**under the open sky, for herding, hunting, gathering and fishing are by nature outside activities and can not be carried out constantly within a limited territory. Therefore dwellings must be adapted to the ecological and cultural conditions of the nomad people. Mobility which characterizes their existence is a primary consideration for the conception of settlements. Thus the dwelling shells and settlements as a whole have the character of a camp in which tents or light structures dominate the structure of space***.

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* According to T. Faegre (1979, p. 4) nomadism and settled agriculture are but two poles of a continuum. Many tribes combine both ways. Thus there is a semi-nomad, who may live part of the time in a solid house, and a transhumant who lives part of the year in a tent, but has his base in settled villages and considers himself a farmer first. These observations might refer to communities or societies in transition.

** Because most of the activities of 'primitive' societies are carried out in the open air, artificially built structures or natural ones such as caves are important mainly as shelter, hence clothing is often more vital to their survival. Yet, clothing production as well as any kind of handicraft, including building, is done within or around the tents or huts (for the sedentary groups).

***For an extensive elaboration on the subject see E. Guidoni (1978) and T. Faegre (1979). While the former author emphasizes in a historical and comprehensive approach to primitive architecture, the latter describes architecture of the nomads focusing on single structures with little or no relationship to the whole settlement. Nevertheless he has written one of the most interesting and complete books on tents. See also Philip Drew (1979) - first chapters on primitive tensile architecture, and C.G. Feilberg (1944).

Sedentary 'primitive' societies (e.g. tribal) are associated with food producing communities where agriculture becomes the chief means of life support. Agriculture is the most important activity of the sedentary people. Other activities such as animal husbandry and fishing might be complementary. The exploitation of land requires a great understanding of ecology in general, for food production needs a substantial knowledge of the ecology of the place; for instance conditions of soil for growth of crops, vegetables, grain, etc., water and humidity required; conditions of seasonal harvesting and storage of the products. This in turn affects the location of the settlement in relation to parcels, as well as the disposition and accessibility of the storage of food within the settlement and also within the dwelling layout (see Figure 3.1). But above all, food production determines the location of the settlement in a territory and the conditions of permanency of the dwelling structures. That is to say, the settlement as a whole and the built structures are permanent in principle, and huts, building units and open spaces between them are the most important element of the spatial configuration. Occasionally, underground architecture becomes a distinctive settlement of sedentary 'primitive' societies.

The association between economy and architecture characterises*, in general, the patterns of 'primitive' architectural processes. These

*Some of these characteristics have been studied by Finn Barnow (1973); Eurico Guidoni (1978) has made a comprehensive description of primitive architecture. He points out these relationships and explores other factors, cultural-historically determined, that play important roles in the shaping of 'primitive' architecture. Other studies related to the subject can be found in Susan Denyer (1978), Colin Duly (1979) and Amos Rapoport (1969), though these authors have a different perspective and rather use a piecemeal approach which hardly gives a clear insight into the subject.

take the form put forward before. We can relate them with the type of society as follows:

| | ARCHITECTURE OF SUBTRACTION | ARCHITECTURE MOBILE/LIGHT | ARCHITECTURE OF ADDITIONS |
|---|---|---|---|
| NOMAD SOCIETY (Band Society) Food-gathering | Natural Caves | Tents or Light Structures | |
| SEDENTARY SOCIETY (Tribal Society) Food-producing | Man-made Cave Dwelling | | Huts. Permanent Structures |

Figure 2.1 Table: 'Primitive' societies and their architecture

This classification is meant to identify the overall character of the case study analysed in the following chapter. In this case we should be aware and to some extent agree with Enrico Guidoni's observation when he asserts:

> "Architecture is never a literal translation of whatever it is we mean by 'society', nor do partial analogies justify assuming a common significance for building belonging to different historical context." (1978, p.8).

Thus, in general, the relationship between the architectural prototypes (architecture of subtraction; light/mobile, and architecture of addition) follows, in relative terms, a historical order. Architectural transformations took place according to broad steps of economic and social structural development; that is, the sequence of development of 'primitive' societies has taken place as changes occurred in their

economy, from a nomadic to a sedentary basis. And probably interdependently, parallel transformations have been taking place in their social structure over a long period of time (e.g. Band, Clan, Tribe, Family, etc), though changing their functions in each place, and transforming to new societies*.

## 2.3 ARCHITECTURAL PROCESS PROTOTYPES IN PRIMITIVE SOCIETIES
### General Characteristics

Three general patterns have been identified with the following:

| ARCHITECTURE OF SUBTRACTION | LIGHT/MOBILE ARCHITECTURE | ARCHITECTURE OF ADDITIONS |
|---|---|---|

Each group of these 'primitive' architectural processes has its own variations with specific characteristics according to the particular place and culture where it emerged and developed. Nevertheless we can point out, generally, the characteristics that place each into a class and also those traits that may differentiate each class from other architectural processes that develop in another kind of society.

The Architecture of Subtraction is associated with underground and cave spaces used for dwelling by 'primitive' societies. Those spaces can be either natural or man-made. The study of the 'primitive' architectural process of subtraction has been neglected; in general it has been poorly reported in spite of the sophisticated development shown in certain cases. For instance, the houses of Cappadocia, Turkey, which have been hollowed out of the rock seem to solve every spatial and other need. They have a wine cellar, food storage, a

*See for instance F. Engels (1968), The Origin of the Family, Private Property and the State.

water cistern and drainage (brief reports were given in the Architectural Review, April 1964, pp. 261-63 and October 1958, pp. 237-40). In addition to blending naturally in the landscape, these houses' shapes are resolved by nature, the result of erosion by wind and water. Other examples of underground architecture have been found in the same area and whole underground cities existed!*

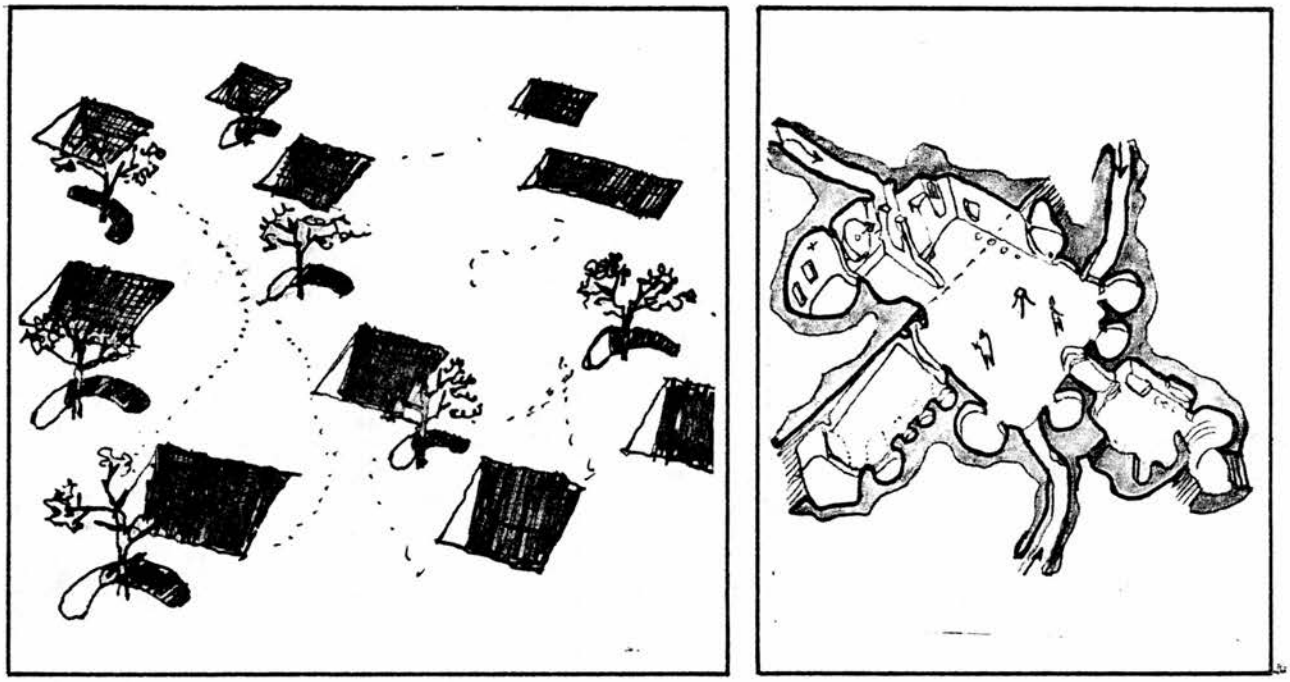

Figure 2.2. Architecture of subtraction, two examples: (1) Underground village in Chinese Loess belt near Tung Kwan. The entrance L-shaped staircases are marked by trees. Rectangular courtyards light and ventilate houses. (2) Underground city in Cappadocia. Perspective from a fortress at Uchisar.
Sources: Gardiner, S. (1974, p.2) and J. Baldwin and S. Brand (1978, p.112). See Rudofsky, B. (1977) chapter titled: 'in praise of caves'.

In Africa, architectural examples (see Figure 2.2) of this nature are still in use. Christopher Williams (1974) has given a brief description of Tijia village. This is located in the mountains southwest of Gabes, Southern Tunisia. Here dwellings have been excavated in a soft clay hillock around a central courtyard. They are well adapted to their inhabitants' needs.

*The author has visited the underground city of Kaymakli in Cappadocia, Turkey. It has eight levels out of which five are uncovered. The rooms of various sizes are interconnected. They have been excavated at both sides and along a ramp-corridor which slopes downwards spirally. Beside this, stairs and passages link the floors. A kind of well is used for ventilation, to take goods down and to bring water up from the bottom. Other underground towns exist in the area; Derinkuyu and Sivasa. The former consists of seven storeys and reaches 85 metres depth. It was built by Christian refugees as a place of hiding where they were organized around a religious communal life. Also many troglodytes and prehistoric settlements exist in the same region, as well as Hittite sites.

To counteract the intense solar radiation of the desert, the same ingenious and radical solution is also found amongst the Siwans of Egypt. They similarly use to advantage the capacity of the earth to absorb heat by building underground. The typical underground house of the Matmata mountains of Tunisia has a large courtyard (about 30 feet square) from which lead six or more underground rooms, as required (see Colin Duly, 1979, p. 32).

Light/Mobile Architecture in 'primitive' societies takes the form of tents of various kind. (Three types are shown in Figure 2.3). Portability, lightness, and flexibility are the essential qualities of the tent, which must respond to the demands and needs of its dwellers.

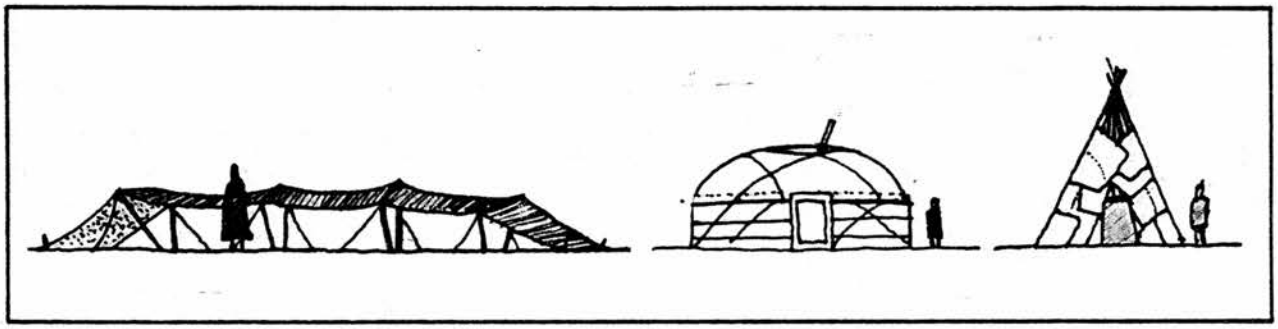

Figure 2.3. 'Primitive' Light/Mobile Architecture, three examples; these are an Arab tent, a Mongol yurt and North American indian tent. They are portable tents of stocks and felt or animal skins.
Sources: After Rapoport, A. (1969, p.27) and Duly, C. (1979) pp.56-67. Further information on this type of architecture is found in Torvald Faegre (1979), 'Tents, Architecture of the Nomads', see also Reginald and Gladys Laubin (1977), 'Indian Tipi', (History, construction and use), and E. Guidoni (1978).

Many tents are only "semiportable" - that is, the frame is left in place and only the cover is moved, though this depends on the availability of resources. Most of the materials used for these types of shelter are easily moved: rolled up and transported with the help of animals (e.g. horses, camels, etc).

Simple stick frame dwellings covered with skin, bark, or mats are found everywhere, particularly among hunting and gathering peoples. Skins are the products of hunting, and most hunters use these both for shelter and clothing. Tents are also made of wool and hair. Black tents* are preferable made of goat hair, for only this fibre has the requisite strength and length. And so its particular tensile qualities give the black tent its distinctive form. Also, often sheep or camel wool or a plant fibre are added. So the tent cloth is like a thick heavy blanket. (T. Faegre, 1979, p. 12).

Tents exist in a variety of forms which characterize the various groups**; though they have common general traits in terms of their internal space organization.

> "the space within the ordinary nomad tent is not large and so must be carefully organized. This organization is always a reflection of social organization and determines where people are seated and where possessions are kept. There is always a division between the men's and women's sides of the tent." (T. Faegre, 1979, p. 7).

These conditions are an effect of social norms and behaviour. Therefore certain variations exist in each culture in terms of use of space***, and (male-female) behavioural domains. In many tribes

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*'The black tent' is the tent of the Bible, the Jews, and the Arabs, and a hundred other tribes scattered over Africa and Asia.'See T. Faegre, 1979, Chapter 1, The Black Tent, pp. 9-59.

**T. Faegre (1979) typified tents into eight groups, namely the black tent (see previous footnote), the Middle Eastern mat-skin tent, the yurt (described below), the Siberian tents, the Lapp tent (North of Norway, Sweden, Finland and Russia), the Invit tent North of Alaska, Canada, Baffin Island and south-east and south-west of Greenland), tents of the North American Taiga and the Tipi (North American Plains). See also E. Guidoni (1978).

***See T. Faegre, 1979, pp. 7,24,34,38,40,46,51,59,91,124,144 and 161 for figures showing the internal use-space distribution of quite different nomad societies.

women occupy a larger space within the tent because they do more work there. Particularly because women make the tents, women are the architects in nomad societies!*

One special type of this mobile architecture is the yurt**. It will be briefly described below.

The yurt is a circular tent. It sshape is close to that of the dome. The dwelling space encloses the maximum volume with a minimum of surface area. Also, the circular walls and upward sloping roof give to the interior a feeling of great space. The framework supports itself, poles and stakes, are not needed. Climatically, it functions in the most versatile manner (see Figure 2.4).

> "The interior is kept warm in the coldest weather by adding layers of thick wool felt to the walls; in the summer, the sides can be rolled up to admit cooling breezes." (T. Faegre, 1979, p. 79).

Functioning economically and symbolically, the yurt is a remarkable piece of architecture. The production*** of it is relatively easy. And

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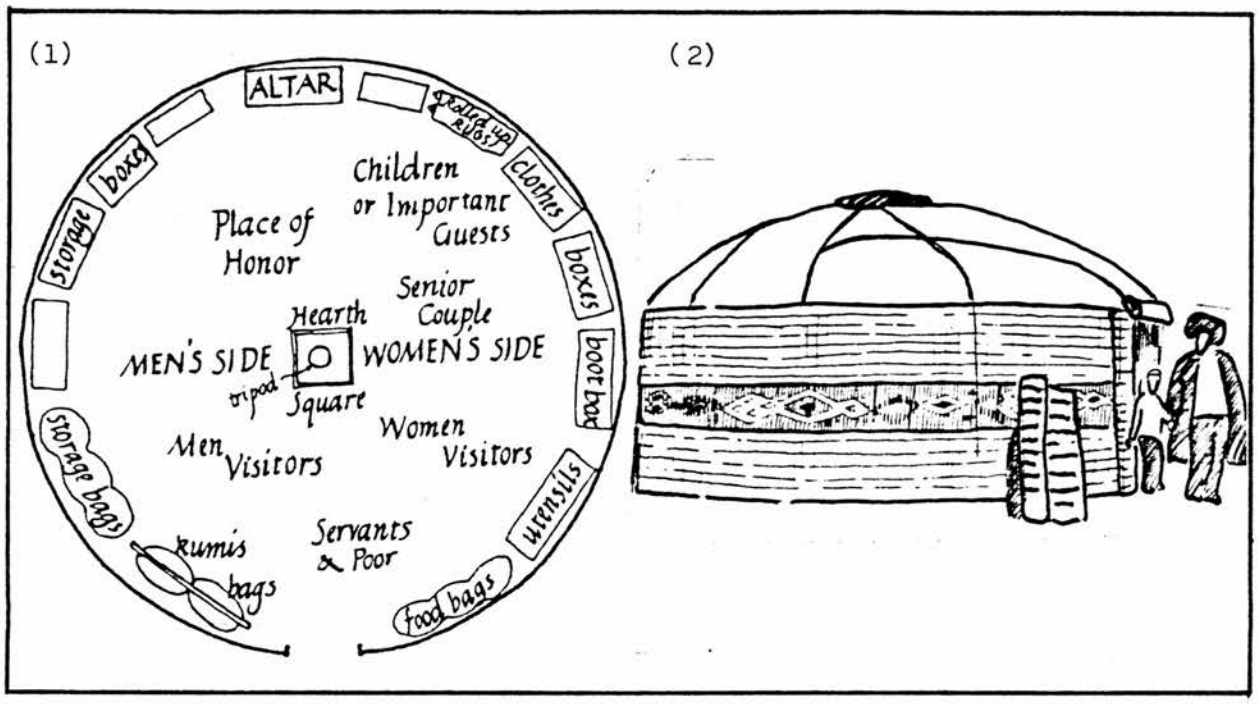
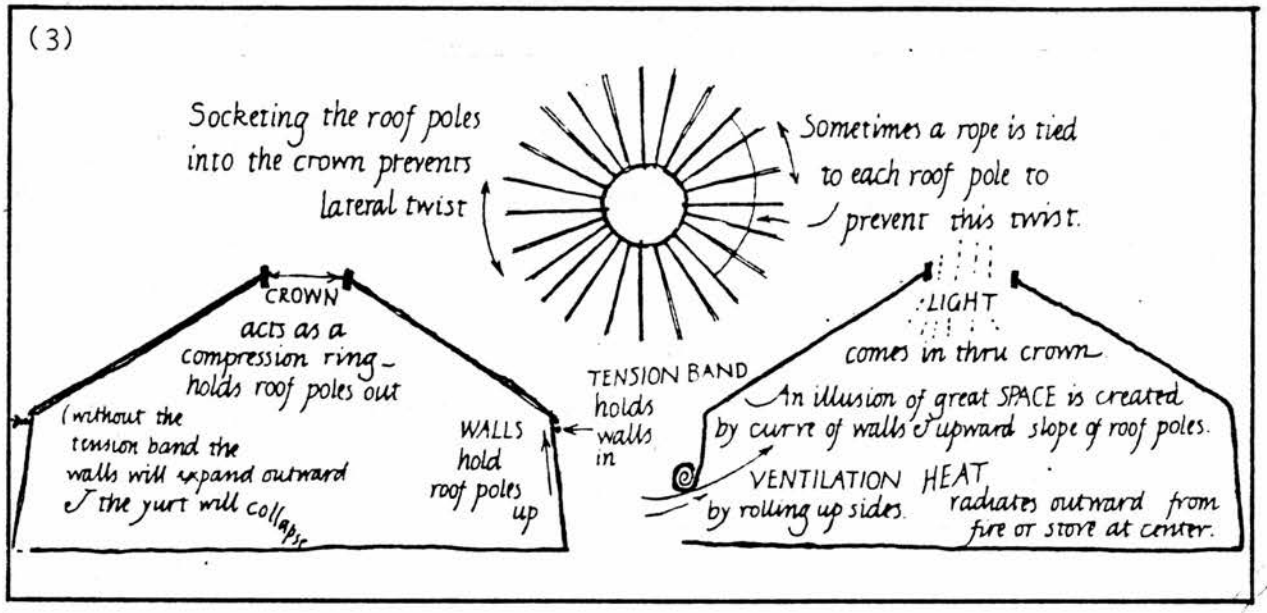
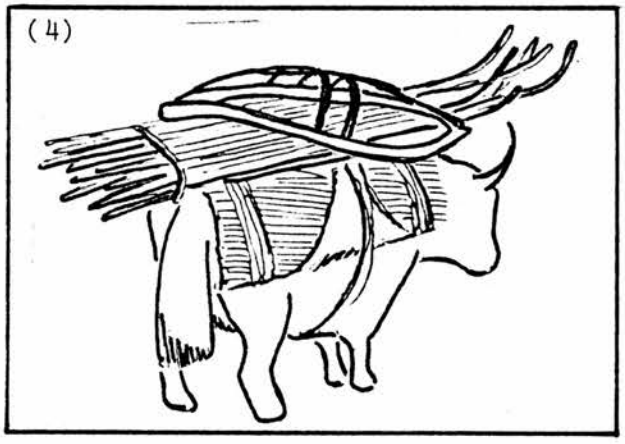
* The men may make the wooden parts but these elements are almost non-existent in tent design, therefore it is the women as weavers, and as leather and bark workers who make and design the tent. (See Faegre, 1979, p. 7.)

** "The yurt is found over an area that stretches from the Caspian Sea, along southern Russia, through Mongolia, and up into Siberia. This is the land of the great Central Asian Steppe, an area of little rainfall, fierce winds, and cold winters. Across this territory are spread Mongol- and Turkish - speaking nomads, descendents of the great Mongol Hordes who built an empire that stretched from China to Europe." (T. Faegre, 1979, p. 80).

*** Torvald Faegre (1979), pp. 78-98, described and illustrated the production processes of the yurt; feltmaking, covering walls, frame, roofs, crown, door; the assembling process and engineering qualities. Amongst these is its extraordinary stability.



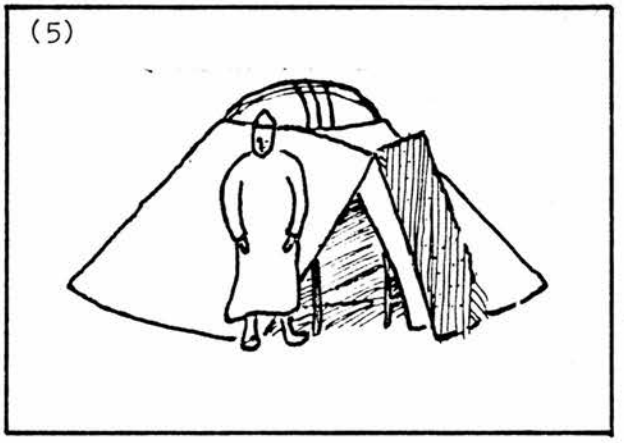




Figure 2.4. The Yurt: (1) Plan - everyone and everything has its appointed place. (2) Reed mats on the wall with a woven band (Turkmen) and felt on the roof. Up to eight layers of felt may be used in the winter time. (3) Sections. Yurt engineering and climate control. (4) Kirgiz yurt transported by yak. (5) The crown, a few roof poles and some felt (of the yurt) are used as a temporary tent when travelling.
Sources: T. Faegre (1979), pp. 91, 82, 87 and 94.

it can be assembled or taken down in less than an hour. In addition, because of its low cost it is widely accessible to the people*. The totality of the yurt and its parts have equally valuable symbolic meanings. The yurt is a mandala. Through hundreds of years, the yurt has become a sacred universe to its dwellers. The roof with a central top hole enriches the activities performed and emphasizes the identity of the dwellers with the cosmos.

> "To the Mongols, the roof is the Sky, the hole in the roof is the Sun, and the Eye of Heaven through which comes the Light. And when in the morning one pours an offering on the hearth fire, the vapours mix with the smoke and rise up to God."
> (T. Faegre, 1979, pp. 92-93).

Architecture of Additions in 'primitive' societies include those structures which are permanent in principle and built upon the ground. They generally take the form of huts; round or square with flat or thatched roofs. The following figure exemplifies two common types.

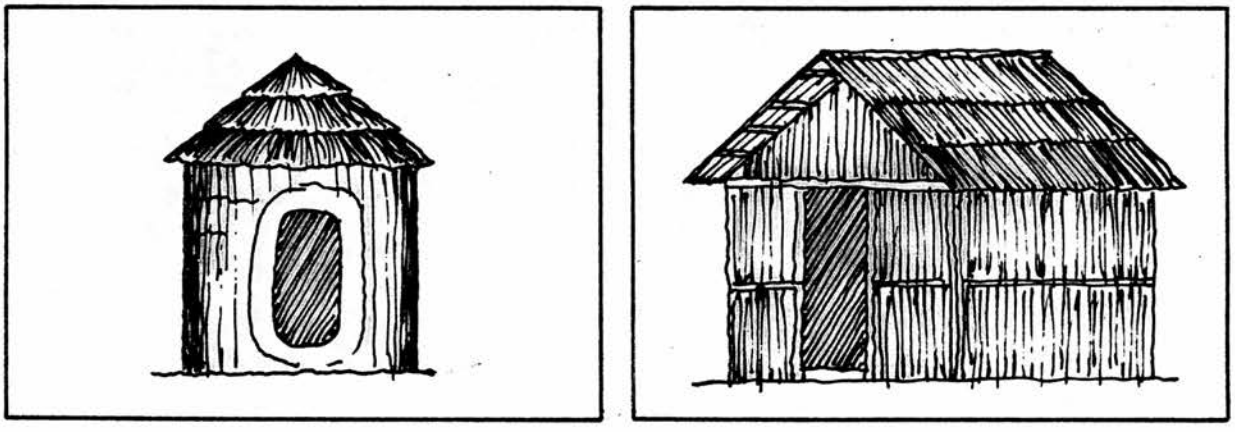


Figure 2.5 Huts - hypothetical examples

Huts are generally the building units which by being grouped and

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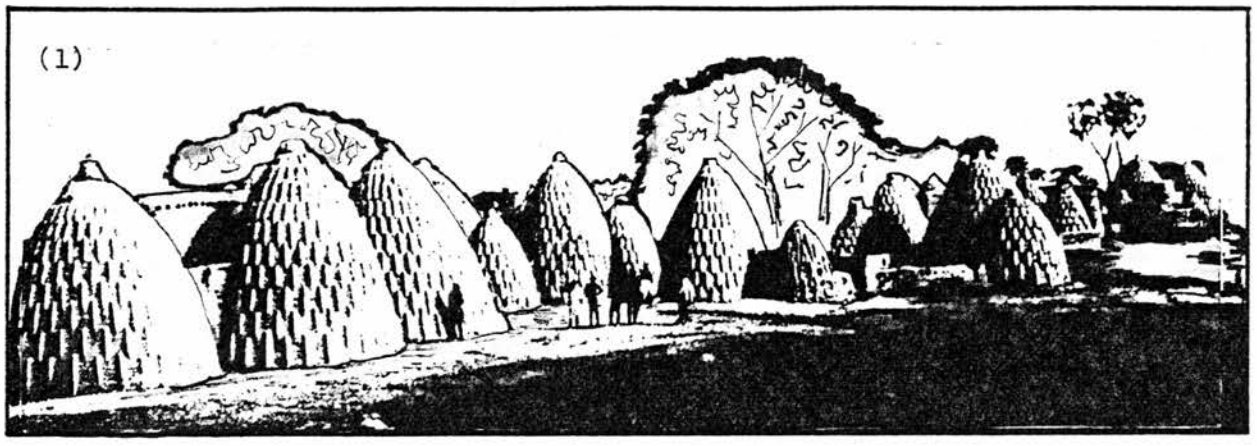
*T. Faegre (1979) reported that in some towns in Mongolia, yurts occupy large areas at a cost to the average worker of only 2 to 3 months' wages, and that modern conveniences have been incorporated.

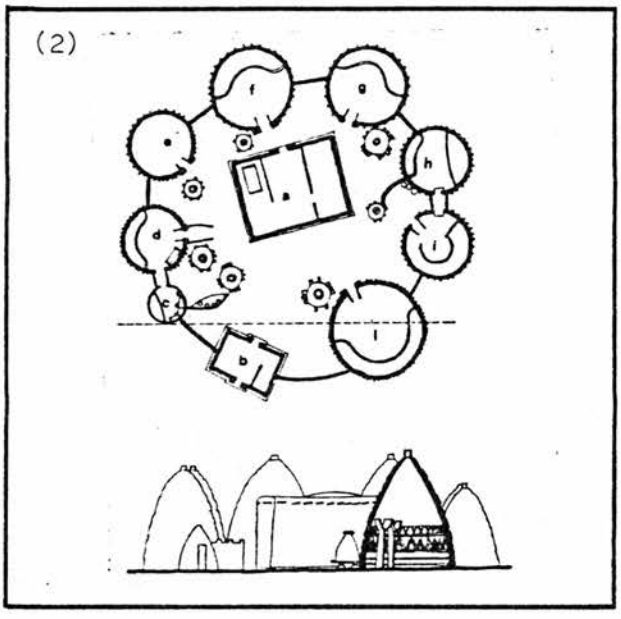
following a certain order in their agglomeration give rise to the particular configuration of the settlement. Specific examples of this type of architecture are studied in detail in the following chapter (3) referring in particular to the Fali and Dagomba groups whose settlements are located in the north-west of Cameroon and Northern Ghana, respectively.

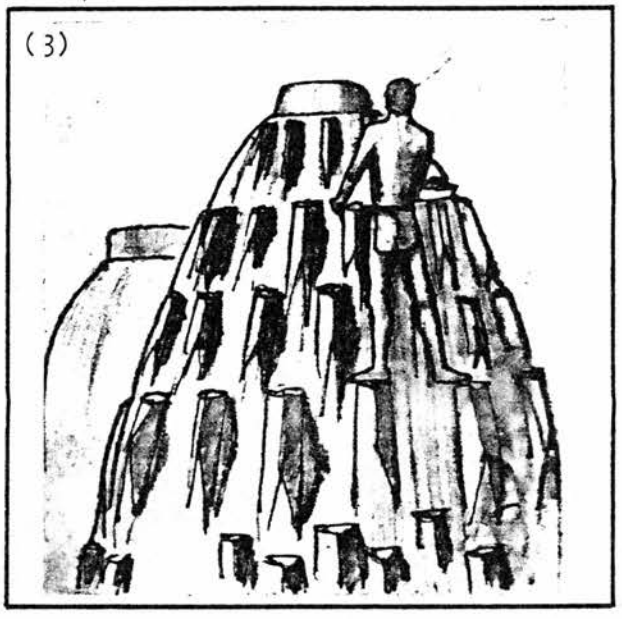
Other variations and special built forms are included under this category. Variations within this general type of architecture of additions are found for instance in Northern Cameroon (Musqum Village) and Chad. There huts are entirely built of mud with no formers. They are true pointed domes (rather than vaults). The huts from those regions are similar. Differences exist between them, particularly in the structure of the domes, which have different relief patterns in the walls (see Figure 2.6).

Special built forms are, for instance, the examples of buildings of Figure 2.7.They are from villages located in the Upper Volta and Ghana. In the three examples shown the walls are curvilinear and in general made of superimposed bands of clay. Here isolated structures, as in the case of huts, are not the elementary space-structure units. Instead there is a 'single building' composed of jointed rooms. Within it, there are a variety of spaces of various sizes. Dwelling units, with one or several rooms, having certain independence, are often well demarcated within the total agglomeration of rooms. See for instance the plan and section of the village of Seripe (Figure 2.7.3).

For each one of the three general patterns of 'primitive' architecture: the subtractive, the light/mobile and the architecture of additions, there is a counterpart in modern architecture, though these



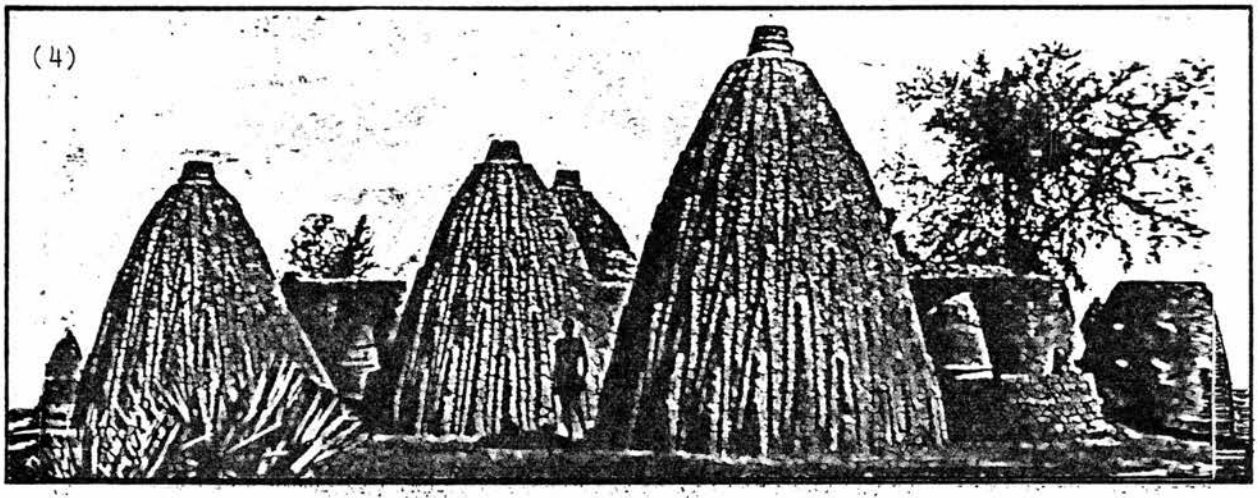




Fig. 2.6 Musgum village; plan section and photographs. 1) Northern Cameroon (1912); 'These houses were built entirely of mud with no formers, that is, they were true domes, albeit pointed, rather than vaults'. The relief pattern in the outside had several functions; It had a decorating function; it made it possible to climb to the top of the house from the outside, possibly for defence; it may have added streamlining and strength; and it may have helped to prevent rainwater erosion channels forming down the sides'. 2) Schematic plan and section of a family enclosure (Cameroon); a) hut of the head of the family; b) entrance; c) kitchen; d) hut of the favorite wife; e) shed for animals; f) hut of a wife and joint kitchen; g) hut of a wife; h) kitchen; i) hut of a wife; l) hut of two wives and a tool room. Between the huts are the granaries; 3) Renovating the upper part of a clay-covered hut with isolated, modeled vertical projections (Chad). 4) Huts and granaries of a family farm with inverted Vs modeled on the exterior walls (Chad). Sources: S. Denyer (1978) p. 131, (1) and E. Guidoni (1978) p. 256.

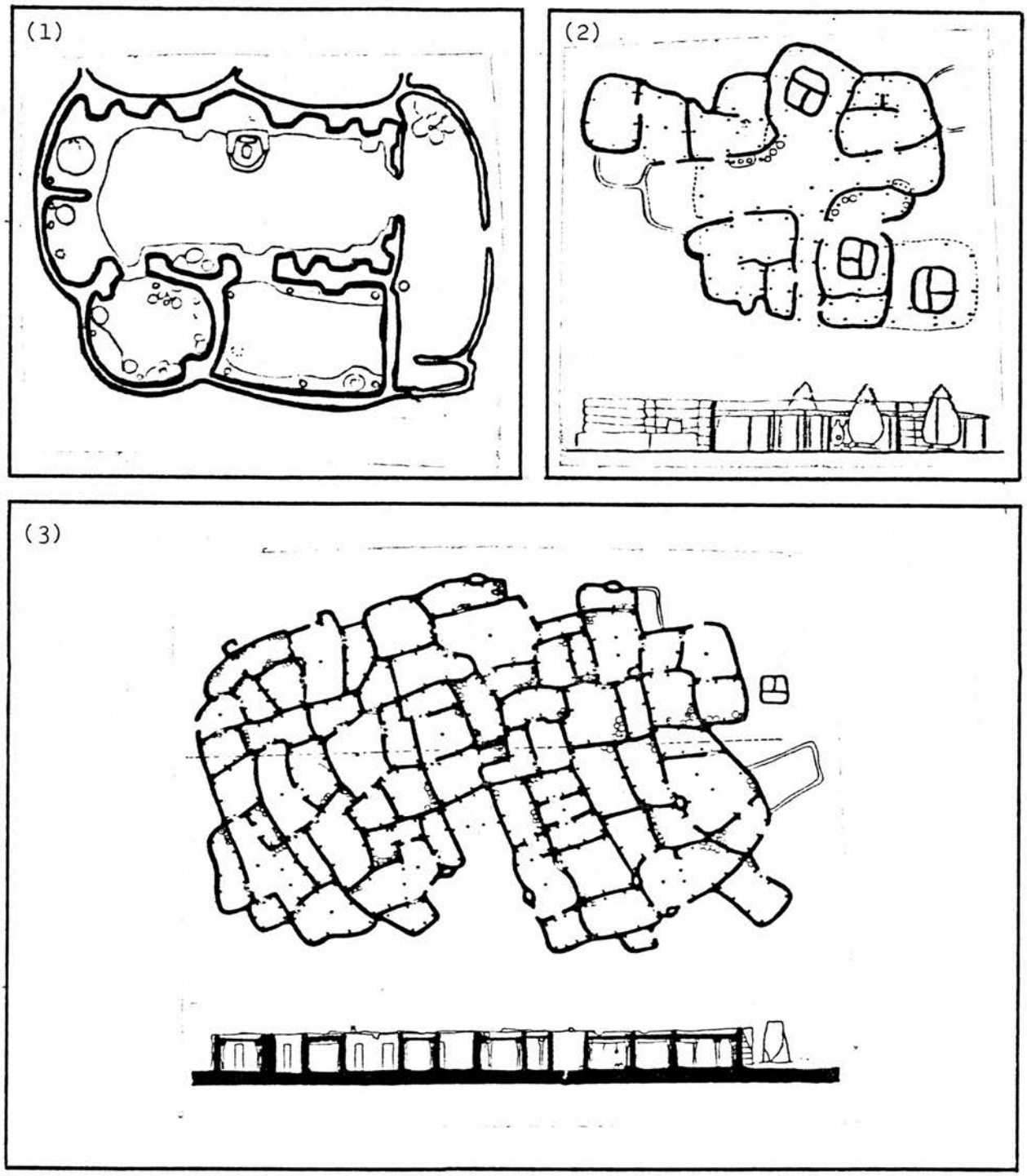



Fig.2.7 Plans and sections of dwellings, from Upper Volta and Ghana's villages. 1) Plan of a family residence in a large circular enclosure. It shows the entrance and main living quarters. The utility areas, storerooms and fixed kitchen furnishings are hollowed out of the thickness of the walls (Upper Volta). 2) Plan and section of a farmhouse with continuous curvilinear walls of supperimposed bands of clay. 3) Plan and section of the village of seripe.

Sources: E. Guidoni (1978) pp. 295-298. See also Babar Mumtaz (1969).

did not always develop in the field of housing, but rather enclosed a variety of functions*. For this reason the proper correlation of these groups in the modern or other architectural processes may not be studied or exemplified; emphasis will be put on housing-architectural processes and transformations that may have correlation with the primitive counterpart architecture of additions.

## 2.4 CONCLUSION

Primitive architectural processes are associated with 'primitive' societies. Kinship relations play a dominant role in all economic and cultural activities of these societies. Subsequently they have a direct effect in the organisation of production and distribution of food, building and other products. 'Primitive' societies' mode of production identified as primitive communism, is characterized by a collective appropriation of land, tools and products (and surplus labour). Authority is vested in the elder or heads of the kinship groups (Chapter 3). These conditions foster the reproduction of the system but also constrain the development of the productive forces and technological means, thus directly effecting building production processes.

The social processes, through the central role of kinship, and underlying mechanisms operating within what covers the relationship between architecture and economy, identify the specificity of the various primitive architectural processes.

*For instance Philip Drew (1979) made a well documented reference to the architecture of 'primitive' societies which developed into light/mobile systems (tents). By doing so he identified the origins of modern 'tensile'architecture. Nevertheless he pointed out that this developed through the technical achievements found in bridge construction. 'Tensile' systems have also been inspired by nests and systems found in nature. The architecture of subtraction's modern counterparts are (cont.)

In order to integrate the typology of architectural processes of 'primitive' societies, the following factors have been taken into account: the mode of building, within which the kinship system plays a central role; the qualities of the structure (whether portable or permanent); and the underlying mechanism conditioning the chief economic activity: food producing or food gathering. The chief economic activity, where the kinship system is also important to its organization, affects the conditions within which the architectural process evolve. Thus the socio-economic processes and architectural processes are circumstantially bound, whereby the interrelationships between them identify the specificity of the architectural process.

The activities of nomad societies, within which kinship relations are dominant, take the form of food gathering, hunting, fishing and herding. This in turn affects both the process by which shelter is provided, and the products which result are portable structures (tents), or the use of natural caves if Nature provides them. The former is typified under mobile/light architecture and the latter falls under architecture of subtraction.

The activities of sedentary societies, within which organization is based on kinship relations, take the form of agriculture (fishing) or animal husbandry. In food producing communities the settlement is permanent in principle. This condition has a direct effect on the building process and the architectural products which are generally associated with huts as the building unit. Nevertheless under these conditions of permanency of settlement, underground architectural

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(cont. from previous page)
traceable at various spot designs, nevertheless a widely spread movement could take place, as several designers and writers have foreseen. For further reference see The Underground Space Centre (1979) 'Earth Sheltered Housing Design'; see also Wells, Malcolm (1977) 'Underground Designs'.

processes are found to be particularly important*. Out of these types the former has been identified as architecture of additions and the latter as architecture of subtractions. Other variations of architectural morphology and settlement configuration are also included under the general category of 'primitive' architecture of additions. Socio-economic processes and architectural processes are mutually interdependent and affected. This results in a variety of architectural products; each one could be identified with a distinct variation of a 'primitive' mode of production of architecture. It is obvious that the labour process is quite distinct for each primitive architectural process prototype**.

Kinship relations with their plurifunctionality and playing a similar role in every economic activity reveal the interdependency of architectural processes and socio-economic processes.

The above conditions show that the nature of food acquisition determines the architectural process, and the mode of production of building is subordinated to the mode of production/gathering of food.

Three general architectural processes prototypes have been illustrated: the architecture of subtraction, the architecture of additions and the light/mobile architecture. The case study presented in the following chapter (3) refers to the architecture of additions. Certain characteristics of the 'primitive' architectural process studied can be applied to the mobile/light or subtractive architecture. Nevertheless these have not been investigated.

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*In spite of their rare existence and poor exploration.

**The labour process is analysed only for the case study, Chapter 3.

The case study rather attempts to understand and differentiate between the various factors that influence the production, spatial distribution, and transformations that occur within the typical 'primitive' architectural processes. This is the theme of the following chapter.

CHAPTER 3

# THE 'PRIMITIVE' ARCHITECTURAL PROCESS DESCRIPTIVE MODEL I

## 3.1 INTRODUCTION

In this chapter an attempt will be made to describe and analyse a typical example of a 'primitive' architectural process. Thus we must identify what 'primitive' architecture means.

The primitive architectural process is associated with 'primitive' societies. These societies are those which almost until the present day, have remained outside the large, highly organized political and economic entities which predominate in the organisation of the modern world. That is to say 'primitive' societies had not been integrated with, nor are developed from, modern states. Anthropologists have made a further distinction that characterises their social organisation. Kinship, which is biologically determined, is dominant in 'primitive' societies (see, for example, Levi-Strauss). These conditions affect the organization of production and distribution which characterises the mode of production as 'primitive' communist*.

The following description is supported primarily by the research done by Labelle Prussin (1969) and Jean-Paul Lebeuf (1961). Both authors

*For a complete analysis of this mode of production see Claude Meillassoux (1964) in Emmanuel Terray (1972): Marxism and 'Primitive' Societies. See also B. Hindess and P.Q. Hirst (1975), Ch. 1: Primitive Communism, Politics and the State.

worked in West Africa Central; the former in northern Ghana where the Dagomba's culture developed, and the latter in northern Cameroon where the Fali's groups settled.

Taken from Labelle Prussin's studies*, mainly Kasuliyili village will be analysed. Kasuliyili is located 25 miles northwest of Tomale, the urban capital of Ghana's Northern Region. Its fifty six compounds contained more than 500 residents in the sixties. The four Fali settlements: Bori-Peske, Boussoum, Tinguelin and Kangou, are situated at the northwest region of Cameroon. The description will be centred on their architectural processes. Architectural examples have been taken from all of them.

The aim of this study is to understand and differentiate the various factors that influence the production, spatial distribution, and transformations that occur within this typical 'primitive' architectural process. Architectural processes from both the Fali's and Dagomba's cultures have been evaluated below. There exist certain similarities between them at various functional levels, but there are differences that characterize each locality. Both similarities and differences will be highlighted. One of the aspects that differentiates these cultures is their Belief System. Dagomba's people were stimulated by Islamic penetration, consequently a large part of the population follows the Muslim religion. Otherwise the rest of the people practice a local one. The emotional attachment to one's

*Labelle Prussin (1969) investigated six villages, each of which belongs to a different group. Kasuliyili belongs to the Dagomba group; Yankenzia to Konkomba Hamlet; Tongo is a Tallensi settlement; Sekai is an Isala; Labaranga is part of the Gonja and Birufu of the Lowiili. These settlements are quite similar in terms of their built form and social organisation. They evolved under very similar conditions.

place of origin is a major characteristic of Northern Ghana's cosmology. Similarly the Fali's belief system has evolved within the culture but they relate themselves to the Cosmos in a more complex manner.

The architecture of both communities, in their respective regions, reflects the climate, materials and the customs of the people. This will become evident from the description. An attempt will be made to understand the nature of the coherence and balance existing between architectural elements and parts and the totality of the architectural cultural environment. That is within the subtle interplay of nature, society and building. The unity and apparent balance that seem to exist between the parts and the whole of this built environment must have an explanation. It is partly our concern to discover it.

The Methodological Approach

The investigation and description of these examples have been organized taking into account the conceptualizations formulated as architectural functions in Chapter 1. The (SCAPEB) architectural functions are the symbolic, climatic, aesthetic, political, economic and behavioural. These architectural functions have been the point of departure. They have been identified as environmental levels. The identification of the structure of each function has been made below, except that the behavioural and the aesthetic functions have been considered implicit in the descriptions. Emphasis has been put on the

*This is valid for this descriptive model as well as for those presented in Chapters 5 and 6.

description and analysis of the economic function. For this purpose some concepts borrowed from Claude Meillassoux (1964)* have been introduced. The characteristics of the architectural functions have been described in tables. Thus their relevant features organized here will facilitate the comparison with other architectural processes (see Sec. 3.7). Finally, in the conclusion, an attempt is made to discuss the relationships between the architectural functions.

Each function may take a different form, in any given architectural process. The political function is related to the controlling 'agents' influencing, directly or indirectly, built form, dwelling space or building process. In this case the political function is identified with the role played by the social (Kinship) institutions in the 'primitive' architectural process.

Because of the uneasy demarcation of boundaries of the domains of the functions, which are mediated by the building object or its production process and, in addition, the need to refer to the human element or activities (the behavioural function), the functions are discussed in pairs. These are theoretical conceptualizations for which the description and analysis of the functions will certify their validity. An attempt is made to identify the features of the correspondence between the functions in each pair. This mainly identifies the nature of the relationship between them.

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*Claude Meillassoux (1964): Anthropologie Economique des Gouro de Cote d'Ivoire. Paris/The Hague. This study has been revised by Emmanuel Terray (1972): Marxism and 'Primitive' Societies. Mary Klopper (tr) Monthly Review Press, London and New York. First published by Francois Maspero, Paris, 1969.

## 3.2 THE POLITICAL AND BEHAVIOURAL FUNCTIONS

The internal organization of the settlements contains the following rules: the organization of each village has as a unit a set of buildings; this is composed of a number of cylindrical huts with conical roofs and of granaries disposed around one or more courtyards; this unit is known as compound. These courtyards are partly or totally covered with mats in Fali's compounds but not in Dagomba villages.

In general, in this type of settlement, the formation of the courtyard is the major determinant in the plan form of a compound:

> "... the courtyard can be either closely defined shape, only partly enclosed by rooms sited around it, or it can be completely surrounded by rooms and walls, or completely enclosed by rooms" (Babar Mumtaz, p. 81)*.

The compound unit may house anything from two, to forty or more people (ibid). The ultimate size of the compound is determined by several factors. These are of a socio-economic and religious nature. Polygamy is an accepted norm in Dagomboland as well as among the Falis. Each settlement has its own characteristics: for instance, Labelle Prussin (1969, pp. 6-27) reported that in Kasuliyili, a Dagomba village, the overall size of the compound responds to the number of wives and family growth. Often monogamy co-exists. But also the acquisition of wives is a function of wealth:

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*Babar Mumtaz (1969) referred to settlements located in the Black Volta (Ghana and Ivory Coast) and identifies the architecture according to formal characteristics into two basic types: i) the open courtyard compound with pitched thatch-roofed rooms, and ii) the enclosed courtyard compound with flat-roofed rooms. Villages in this area consist of groupings of compounds of either one or the other type. This classification is to some extent appropriate to our village studies after the local differences identified have been taken into account. Nevertheless we should keep in mind that the reference is made exclusively at the level of the physical form.

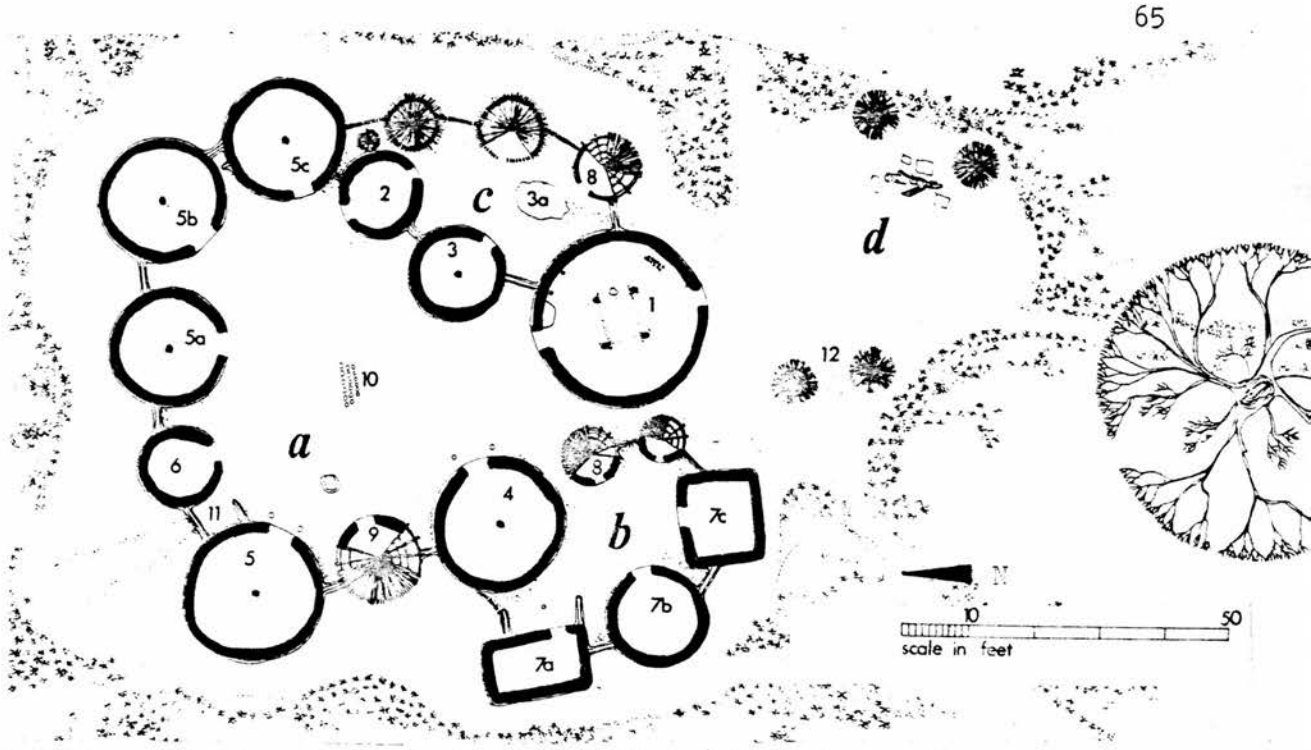


Fig.3:1 A Dagomba compound at Kasuliyili. a) Main internal courtyard area, b) Segregated compound area for the sons, c) Courtyard of the deceased elder c) Congregation area at the entrance of the compound. 1) Reception antechamber 2) Antechamber of the decease elder, 3) Sleeping room of the compound founder (elder), 3a) Mound grave of the compound founder, 4) Present compound owner's room, 5,5a-c) Wifes rooms, 6) Wet-season kitchen, 7a-c) Rooms of unmarried sons, 8) Chickens, 9)Goats, 10) Communal cooking stones, 11) Bathing enclosure re, 12) Ground nut granaries.
Source: L. Prussin (1969, p. 33.)

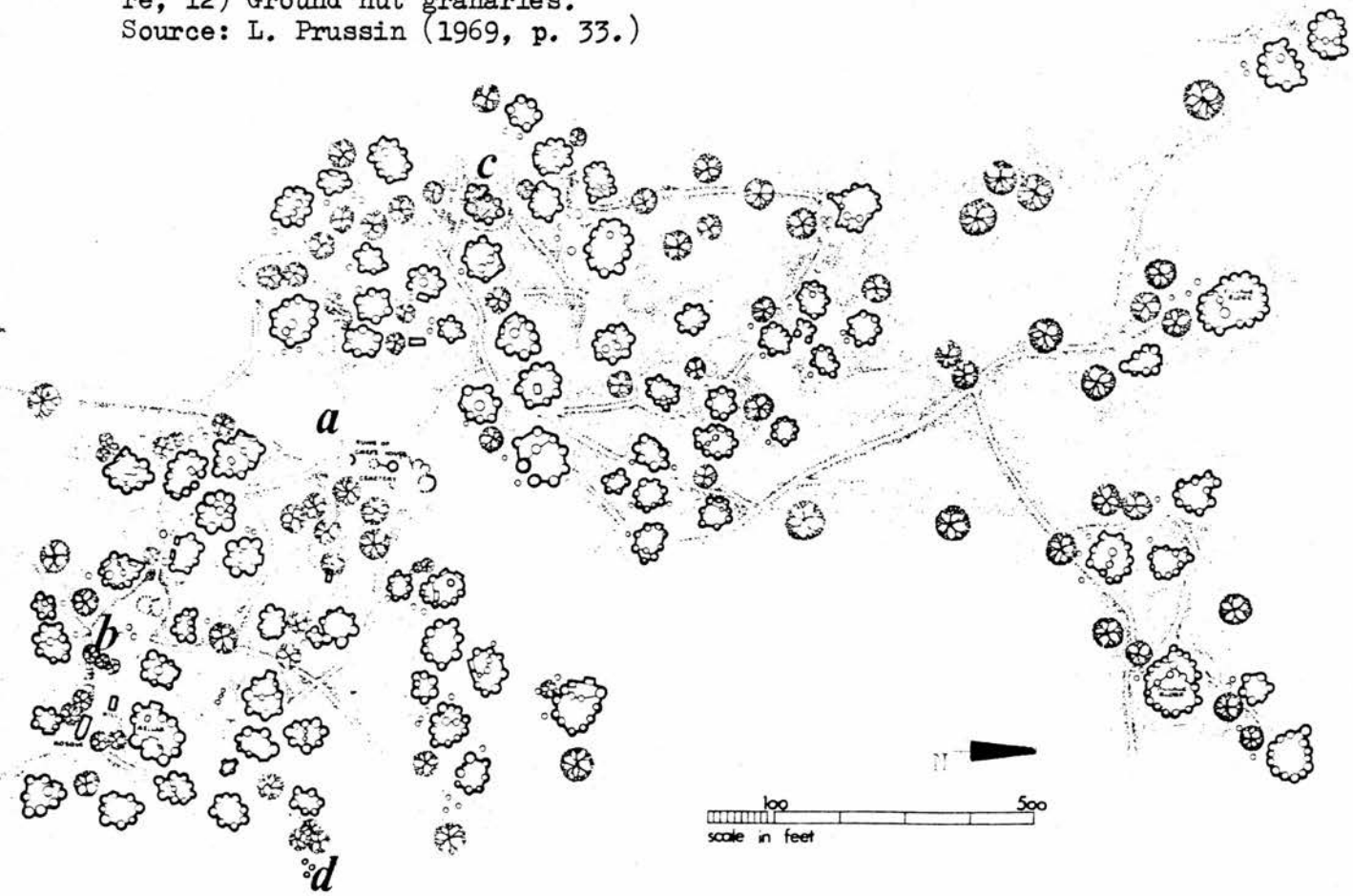


Fig. 3.2 Plan of a Dagomba Village: Kasuliyili. a) Ruins of the chief's compound, b) Open space enclosed by the mosque, the corn mill, and the mallam's compound, c) Location of the illustrated compound, d) The calabash menders.
Source: L. Prussin (1969, p.24.)

> "... a wealthier man has more wives through his life span. The consequent family growth requires a larger compound" (Labelle Prussin, 1969, p. 27).

Wealthier people and more numerous families are found among the Muslim sector. These facts have certain influences upon the overall settlement organization. Physically, the village is discretely separated into two sectors (see plan in Figure 3.2); one for the families following a local religion and the other for Muslim families*.

A hut is assigned for each member of the family, thus the family composition is reflected in the compound plan, and the lineage continuity in the village physical organization; that is the internal physical arrangement of a settlement may be constructed as a projection of the residential social structure as it exists in a point in time. The actual disposition of the compounds in relation to one another can, in most cases, be projected from a genealogical chart. We can describe this unity that exists between the social structure of a familial unit and its material manifestation as a conjunction of social and physical structures.

To this synchronic synthesis must be added the temporal dimension:

> "... the family compound reveals not only the inter-relationship that is obtained at a given point in time, but internal changes that take place over time, from its inception, through its growth, and ending ultimately in its disintegration, when the compound structure is abandoned, its hollow shell crumbling back to earth". (Labelle Prussin, 1969, p. 57)

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*According to Labelle Prussin's observations, this pattern is characteristic for every village in West Africa, where Islam has been introduced and where it continues to exist side by side with the local religions (pp. 25-26).

The family relationships are constantly changing, and hence continual revisions of the plan are required. The family unfolds at the same pace as that of the compound development. The compound arrangement reflects this developmental cycle:

> "... like a living organism it is a process of continual change, a process facilitated by the plastic quality of the material of which it is fashioned".

The transformations that occur in the family structure through life are reflected in the physical process of transformation of the compound. This parallelism can be identified as taking place as a concurrent change of the social and physical structures. Changes in both spheres occur one after the other, though changes in family relationships can more easily and rapidly be affected than whatever is modified in the physical counterpart. Yet in turn any major or minor building operation takes place only during the dry building season. We can assert that the more durable a building material and building structure is, the more resistance it has to change and the lack of partial and/or total flexibility the initial form in which it is cast may in turn dictate, to a certain extent, the social relationships.

## 3.3 THE CLIMATIC AND BEHAVIOURAL ARCHITECTURAL FUNCTIONS

The climatic functioning of the compound side by side with its behavioural counterpart, is a response to the following climatic conditions.

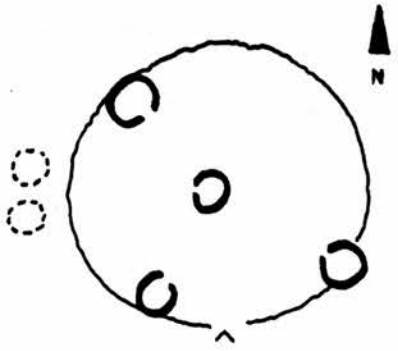
The Southern Savannah climatic belt, where Northern Ghana lies, is characterized by a single rainfall season alternating with a single

STAGE I

At Kasuliyili:
Monogamous and
Polygamous.

Primer Compound
contains 3 circular
room units

i) An antechamber,
ii) Head of compound's room,
iii) First wife and young child (ren),
iv) Temporary huts,

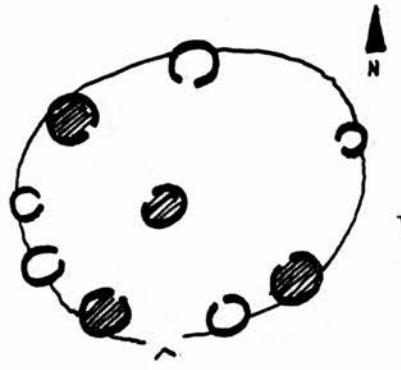



Fali's pattern
Monogamous.

i) Granary,
ii) kitchen,
iii) Wife's room,
iv) Temporary huts,

STAGE II

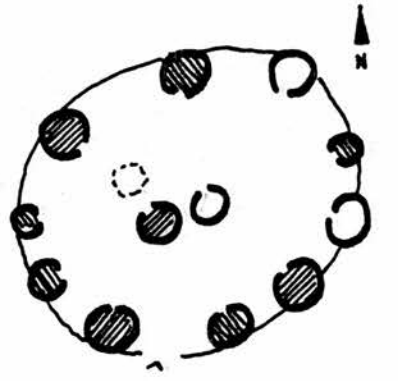
v) Kitchen,
vi) Granaries,
vii) Store rooms
viii) Animals' section and walls.




v) Head of compound's room,
vi) Tool's store room,
vii) Animals' section,
viii) Courtyard shelter (partly covered) and strawmat walls.

STAGE III

ix) Second wife's room,
x) Granaries,
xi) Sons' section (see plan of Kasuliyili),
xii) Other wives' rooms, granaries, store-rooms




ix) Granaries,
x) Store rooms,
xi) Children's rooms
xii) Courtyard shelter

Other huts and enclosures appear for a variety of uses in different compounds. For instance there are store rooms for: wood, salt, ash, tools, beer, vegetables, and also huts as: chapel of ancestors, coffin store, goat/sheep hut, resting room, and enclosures such as animal/chicken run or grounding place; they are built at any stage.

N.B. Hatched lines indicate development at previous stage.

Fig. 3.3 Compound development at three selected stages.

Sources: L. Prussin (1969) and J.P. Lebeuf (1961)

STAGE I

| Structures | Components of Dwelling Structures |
|---|---|
| From the beginning the structures are built on permanent basis. Each hut built is totally finished before being used. Provisional huts may be built earlier if the new compound site is far from the nearest kin's compound. | Two main components are identifyable:<br>1) Round mud walls:<br>a) Built-in furnishings,<br>b) Decoration,<br>2) Conical thatched roofs,<br>Open hearth for dry season |

Similar conditions of development occur for both, the monogamous and poligamous groups.

STAGE II

| | |
|---|---|
| Same building processes are used. More huts and granaries are added. Enclosing mud-walls or mat-walls and part of coutyard shelter are added. | Same elements are identified but with variations in the roof system of the bigger huts. |

STAGE III

| | |
|---|---|
| Same building processes are used. Similar extension units are added. More huts and granaries are added. | Same elements are identified having the characteristics of previous stages. |

Transformations in the compound are affected by:

1) Number of wives and children
2) Length of family cycle, e.g. when a male marry it shrinks,
3) Harvest surplus affect size and number of granaries,
4) Poligamous compounds either grow, integrate the new wives' sections or by adding the new section separatedly.

Fig. 3.4: Compound development at three selected stages.
Sources: L. Prussin (1969) and J.P. Lebeuf. (1961)

drought season. The rains begin towards the end of May, increase in intensity through June and July, decrease slightly in August, and reach their maximum in September. The dry season, lasting from mid-October to mid-May, is accompanied by increasing temperatures which reach their highest point in April. During January, winds from the Sahara blow from the north-east, bringing with them a sheet of fine dust which increases the heat and aridity of the area (L. Prussin, 1969, p. 9).

In the north-west region of Cameroon the temperature is high, with an annual average of around 24°C. Rainfall, of relatively little importance, is spread over a fairly short period (June - September), reaching 800 mm at Garova (in the south of the Fali's settlements). During the dry season a dry prevailing wind blows from the north-east, while the rainy season brings with it the humidity of the south-east (J.P. Lebeuf, 1961, Ch. I).

The architecture of the compound consists of a variety of room units of various sizes and these are used for a variety of functions: bedrooms, kitchens, store rooms for various seeds and grains and also for keeping animals. These roofed spaces and the open spaces formed by the grouping of the cylindrical huts integrate the compound architecture. Both types of spaces, internal and external (courtyard) appear balanced and unified; they seem to be about equal in terms of the area occupied. There is a unity of the spatial arrangement due to both the repetition of circular* huts and the concurrency of the hut openings towards the centre of the courtyard (see Figure 3.1).

*Among the Fali all huts are circular; among the compounds of Dagomba one or two huts out of fifteen, in general, are rectangular.

TAMALE 9°24'N, 0°50'W 635 ft

| Period 1939-1953 Bibliography 57, 59, 60 | Temperature | | | | | | Relative humidity | | Precipitation | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Average daily | | Average of highest each month | Average of lowest each month | Absolute | | Average of observations at | | Average monthly fall | Maximum fall in 24 h | Average No. of days with 0·01 in or more |
| | Max. | Min. | | | Max. | Min. | 0600 | 1200 | | | |
| | *degrees Fahrenheit* | | | | | | *per cent* | | *inches* | | |
| January | 96 | 69 | 100 | 63 | 103 | 59 | 36 | 20 | 0·1 | 0·9 | 0·6 |
| February | 99 | 73 | 103 | 66 | 104 | 63 | 56 | 33 | 0·1 | 0·5 | 0·4 |
| March | 99 | 76 | 104 | 70 | 105 | 66 | 62 | 37 | 2·1 | 2·8 | 0·4 |
| April | 97 | 76 | 102 | 70 | 106 | 68 | 80 | 52 | 2·7 | 3·1 | 6 |
| May | 92 | 75 | 98 | 69 | 102 | 66 | 88 | 62 | 4·1 | 3·2 | 10 |
| June | 88 | 72 | 94 | 68 | 97 | 66 | 92 | 69 | 5·6 | 2·6 | 12 |
| July | 85 | 72 | 91 | 68 | 94 | 65 | 94 | 72 | 5·3 | 3·1 | 14 |
| August | 84 | 71 | 90 | 68 | 92 | 67 | 95 | 74 | 7·7 | 3·7 | 16 |
| September | 86 | 71 | 91 | 68 | 92 | 66 | 95 | 74 | 8·9 | 3·2 | 19 |
| October | 90 | 71 | 94 | 68 | 96 | 66 | 94 | 66 | 3·9 | 2·7 | 13 |
| November | 94 | 71 | 97 | 66 | 99 | 61 | 78 | 42 | 0·4 | 0·7 | 1 |
| December | 95 | 68 | 98 | 62 | 100 | 59 | 54 | 27 | 0·2 | 0·8 | 0·8 |
| Year | 92 | 72 | 104 | 62 | 106 | 59 | 77 | 52 | 41·0 | 3·7 | 93 |
| No. of years | 13 | 13 | 13 | 13 | 13 | 13 | 5 | 5 | 13 | 13 | 13 |

MAROUA 10°36'N, 14°19'E 1302 ft

| Period 1941-1955 Bibliography 40, 43 | Temperature | | | | | | Relative humidity | | Precipitation | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Average daily | | Average of highest each month | Average of lowest each month | Absolute | | Average of observations at | | Average monthly fall | Maximum fall in 24 h | Average No. of days with 0·004 in or more |
| | Max. | Min. | | | Max. | Min. | 0600 | 1200 | | | |
| | *degrees Fahrenheit* | | | | | | *per cent* | | *inches* | | |
| January | 93 | 67 | 99 | 57 | 103 | 53 | 35 | 22 | 0·0 | 0·0 | 0 |
| February | 96 | 70 | 96 | 61 | 110 | 55 | 30 | 20 | 0·0 | 0·0 | 0 |
| March | 102 | 75 | 109 | 67 | 112 | 60 | 30 | 19 | <0·1 | <0·1 | 0 |
| April | 105 | 78 | 110 | 67 | 114 | 61 | 40 | 22 | 0·7 | 1·2 | 3 |
| May | 101 | 76 | 107 | 67 | 110 | 64 | 71 | 40 | 2·7 | 2·6 | 8 |
| June | 96 | 73 | 103 | 66 | 106 | 64 | 81 | 51 | 4·3 | 4·0 | 9 |
| July | 91 | 71 | 99 | 68 | 104 | 65 | 89 | 63 | 8·1 | 3·2 | 15 |
| August | 87 | 70 | 95 | 67 | 101 | 65 | 91 | 68 | 10·3 | 6·3 | 20 |
| September | 90 | 71 | 97 | 66 | 100 | 66 | 91 | 63 | 6·7 | 3·0 | 11 |
| October | 96 | 71 | 102 | 65 | 107 | 62 | 78 | 41 | 0·6 | 1·1 | 2 |
| November | 97 | 71 | 103 | 63 | 108 | 60 | 40 | 23 | <0·1 | 0·1 | <1 |
| December | 93 | 67 | 99 | 59 | 103 | 54 | 37 | 26 | 0·0 | 0·0 | 0 |
| Year | 96 | 72 | 110 | 55 | 114 | 53 | 59 | 38 | 33·4 | 6·3 | 68 |
| No. of years | 10 | 10 | 10 | 10 | 10 | 10 | 5 | 5 | 10 | 10 | 10 |

Figure 3.4a. Temperature, Relative Humidity and Precipitation of the cities of Tamale (North of Ghana) and Maroua (North of Cameroon).

$99^{\circ}F = 37^{\circ}C$ $\quad$ $107^{\circ}F = 42^{\circ}C$

$57^{\circ}F = 14^{\circ}C$ $\quad$ $67^{\circ}F = 19^{\circ}C$

Sources: Meteorological office (1967. part IV, pp 54 and 83).

Materials and decoration enhance these mentioned qualities. Both types of spaces are responsive to the needs of the occupants; people's activities seem to take place in a comfortable atmosphere. There is a fluidity in the relation between the climatic and behavioural functions that in turn creates a unity between adjacent closed-in and open spaces (see Figure 3.5 below).

Climatic conditions characterized by long, dry, hot seasons foster extensive outdoor living activity. L. Prussin (1969, p. 116) asserts that Northern Ghana's daytime climate requires minimal provision for shelter; nevertheless the physical environments provided have some degree of elaboration. Compound rooms have few openings for light or air (rooms have only one opening, the entrance, except for the

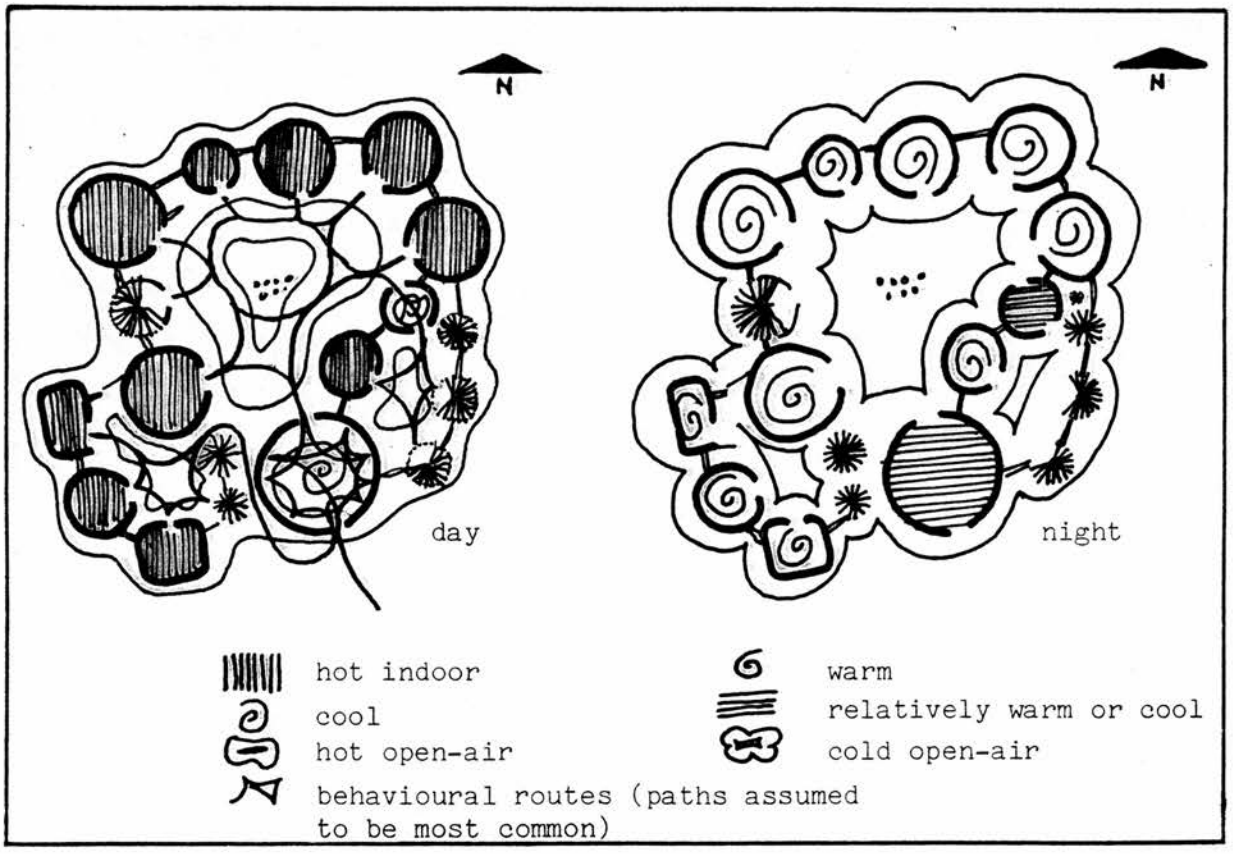



Figure 3.5 Diagramatic representation of the Climatic and Behavioural functions. (Dagomba compound, Kasuliyili).

antechamber which has two) because, during the dry season there is an enormous temperature differential between day and night, and the heat built up inside the room during the day becomes essential for comfort at night. The absence of windows is therefore deliberate: warm air is trapped and retained within the room at night.

In the compounds of the Fali the courtyards are partly or completely covered with mats. This on the one hand shows the dwellers' skilfulness in solving a problem (climatic and technical); on the other hand, consequently, this solution increases the opportunity to experience comfort in a semi-open space (see P.J. Lebeuf, 1961).

There is a 'coordination' between the behavioural function, at the compound and room unit levels, and the climatic function in both levels. Huts with only one opening offer few possibilities for experiencing a comfortable shaded interior space, nevertheless in both settlements under study, there is an alternative space which can be used at any time during the day. The antechamber, a larger hut with two openings in the case of the Dagomba (see plan of Kasuliyili) or the part of the courtyard which is covered with mats (in the Fali's compound). This is a shaded and ventilated place located next to the huts.

The modified climatic conditions influence to some degree, though not deterministically, the behaviour of the users, or we can say that the architecture is adjusted to their behavioural needs. Whatever is the prime modifying factor, there is a synchronization between the climatic function and the behavioural function.

## 3.4 THE SYMBOLIC FUNCTION

The architecture of Fali is not only the product of adaptations to the environment, to the social structure, and to the materials available, but also a complex and independent expression of an ideology.

The main organizational principles are a division of space into four parts and a hierarchical cohesion between the diverse elements based on the form of the human body. Within each village, this anthropomorphic spatial hierarchic arrangement is set according to four complementary symmetrical modes: *

> "The macrocosmic order (the earth is subdivided into four parts: head, trunk, upper limbs, lower limbs, with its centre represented by the sexual organs) corresponds to the different positions assumed by man-the-microcosm representing the four different groups during the act of procreation."
> (E. Guidoni, 1978, p. 258).

Other organizational patterns respond to the significance of the tortoise and of the toad. The Fali's myth of the creation of the universe is of a balanced correspondence between the two cosmic eggs: those of the tortoise and the toad. The value given to this belief in relation to their habitat is very important because the tortoise is identified as having given to man the model for his house. (E. Guidoni, 1978, p. 255; J.P. Lebeuf, 1961).

These two matrices of belief (see Figure 3.6) are reflected at every morphological level. They propose a complete interpretation of spatial reality, from the territory down to architectural details. The

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*At the regional level the four Fali groups (from north to south: The Bossum, Bori-Peské, Kangu, and Turgelin) think of themselves as situated at the four cardinal points of their territory.

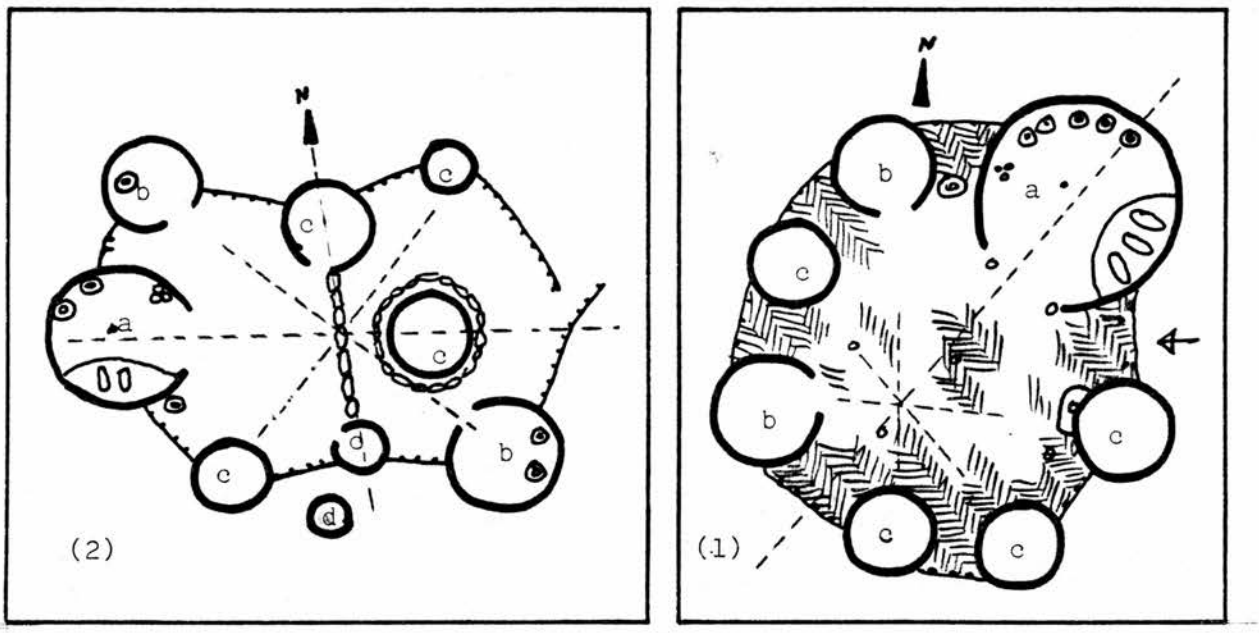


Figure 3.6: Two dwelling plans from the Fali -
(1) Schematic plan of the dwellings of a monogamous family; (a) kitchen; (b) sleeping quarters; (c) granaries. The dotted lines indicate the axes of symmetry and the structural correspondences with the body of a tortoise.
(2) Schematic plan of the dwelling of a patriarch with a single wife; (a) kitchen; (b) sleeping quarters; (c) granaries; (d) storage place. The dotted lines indicate the axes of symmetry and the structural correspondence with the body of a tortoise.

Sources: E. Guidoni and J.P. Lebeuf

cosmological conception of the Fali fosters their creative abilities which crystallize in their architectural morphology. We can find a visual homogeneity of forms in the dwelling huts, in both the Dagomba and Fali communities, each with their local characteristics; nevertheless there are rich variations expressed in the designs of granaries.

The interaction between the Fali's ideas and their physical reproduction has been described by Enrico Guidoni as follows:

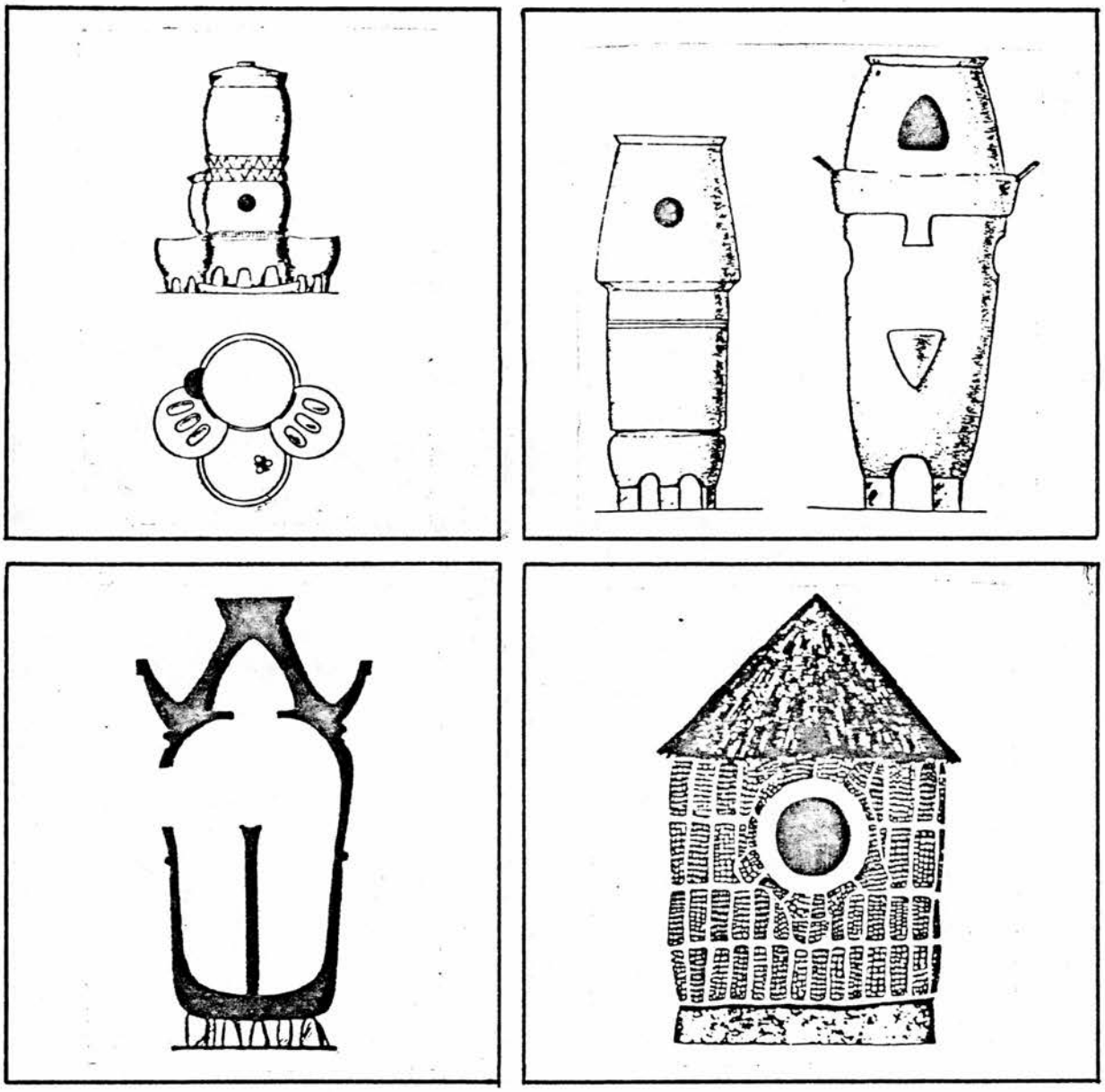

Fig.3.7 Fali: elevations and section of granaries. 1) Elevation and ground plan of a granary of ma beli type with a hearth, two grinding stones, and a small bintin silo as annexes. 2) Two granaries of ma type. 3) Section of a granary of bal do type. 4) Granary painted with the mythic toad motif.

Sources: E. Guidoni (1978) p. 254.

> "This subdivision into two unequal parts corresponding to tortoise and toad is also reflected in the organization of human society, which is subdivided into corresponding groups, the organization of the territory (with its inhabited part and its wilderness), and the organization of the dwelling. Every successive differentiation came about through a series of 'vibrations' of alternate and contrary movements, which guaranteed the universal self-perpetuation of the equilibrium between the opposites. Every region, every group, every architectonic element either partakes of one of these virtually complementary movements or is thought of as a fixed point that acts as a pivot for the motion of the parts around it. This reciprocal dynamism of all the elements, subdivided into male and female, represents a virtual rotary motion, clockwise or counter-clockwise, that effects, first of all, the two essential parts of the habitation: the feminine, cylindrical part in masonry and the masculine conical covering made up of rafters and straw, which circle in inverse direction to each other". (E. Guidoni, 1978, p. 255).

The Fali's belief system, based on anthropocentric conceptions and on the interaction of opposites, is reinforced through their symbolic physical representation. This symbolism is represented at every level, from the regional level down to any object that fulfils a need or in simply decorative motifs. Anthropomorphical interpretation is found in the interior furnishings, details of the altars, blast furnaces, and utensils.

Spatial production and organization is influenced by the system of beliefs also through the measurement system of the Fali. All measures of buildings are anthropometric (J.P. Lebeuf, 1961, p. 183). The measurements system is based on specific body relationships.

These body relationships identified by J.P. Lebeuf (1961, p. 183) are the following: the distance between the thumb and the middle of the open hand, between the elbow and the middle of the open hand, between the elbow and the furthest point of the closed fist, between tip and

tip of the fully outstretched arms, between the navel and the soles of the feet, between the shoulders and the feet, between the chin and the feet, and between the top of the head and the feet.

The body's measurements are directly reflected in the dimensions of the architectural elements, whether interior areas or wall openings. Therefore this system helps to affirm the material production and reality supporting the myth, the super-structural cultural system. Thus we can identify a degree of 'dominance' of the cultural matrices of belief upon the production and organization of space. Due to the way it permeates and balances with other cultural-environmental factors that influence the production and organization of space, we cannot yet affirm that it has purely a super-structural role*.

## 3.5 THE ECONOMIC ARCHITECTURAL FUNCTION

When the head of the compound decides to build one, two or more huts, the site is selected. The site should fall within the compound's territory. The diviner is consulted and decides whether or not the construction should be carried out in the new site suggested by the head of the family. (J.P. Lebeuf, 1961, p. 182).

The Dagomba and the Fali's subsistence economy, as well as in any other 'primitive' society, rarely permits the luxury of specialized craftsmen engaged in full-time building activity. Furthermore, the level of work differentiation in building rarely extends beyond the kinship

*This observation also has been suggested by Eurico Guidoni. Yet he does not investigate and evaluate the effect of other factors, e.g. the economic one, which have been indicated to counterbalance the ideological system described. See the conclusion of this paper.

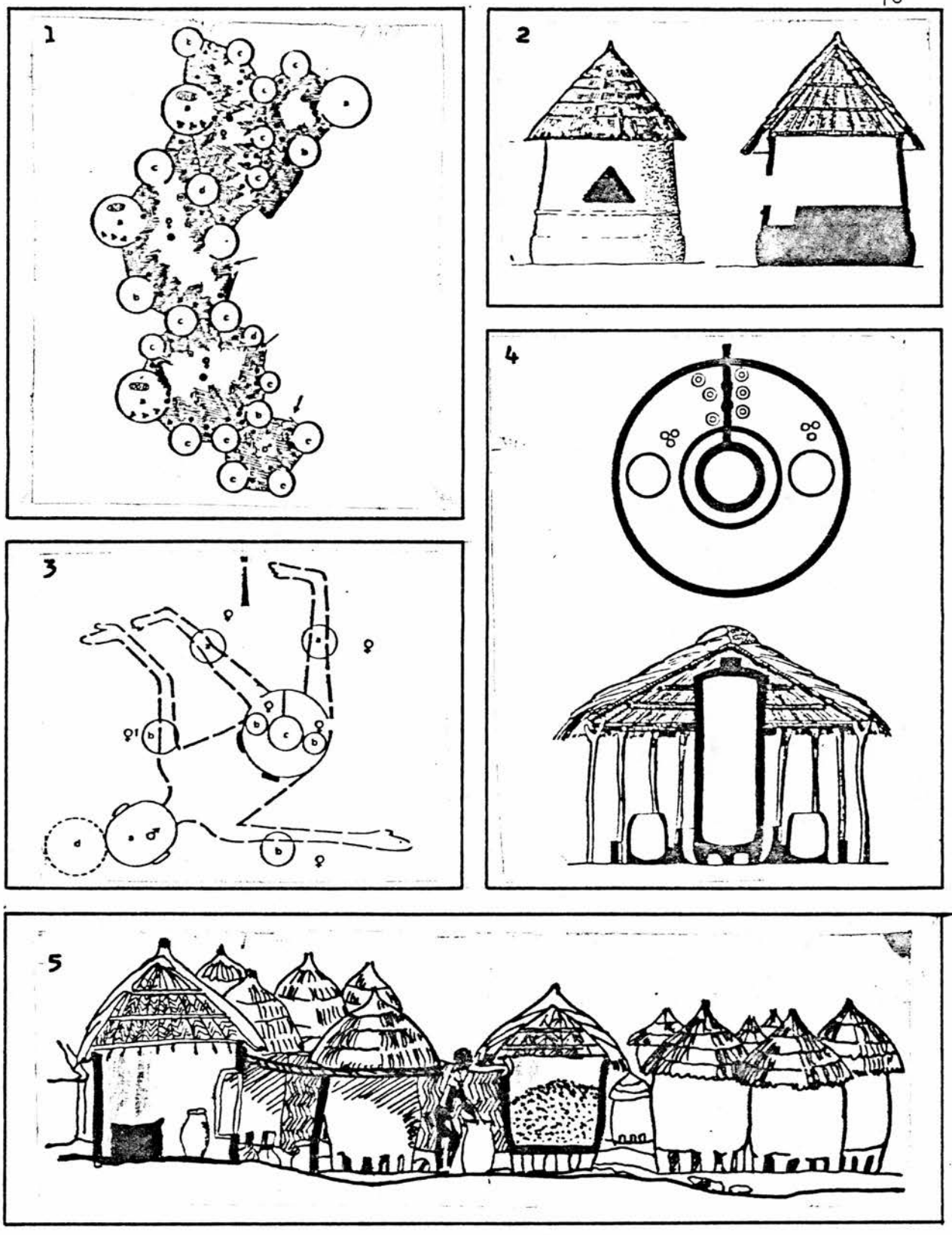


Fig.3.8 Plans, sections and facades of the Fali's dwellings. 1) schematic plan of the dwelling of a patriarch; a) kitchens; b) sleeping quarters; c) granaries; d) storage places. 2) Elevation and section of the sleeping quarters of an adult. 3) Anthropomorphic conception of a residential enclosure; a) sleeping quarters; b) granaries; c) central granary; d) vestibule. 4) Ground plan and section of an aggregate of units (timoyu) with a granary in center, two bintin silos, and two areas used as kitchens and separated by a low wall. 5) Section of the compound of a patriarch; Ngoutchoumi (t).

Source: E. Guidoni (1978) p. 253, and J.P. Lebeuf (1961) p. 313, (5).

group.

There are those who have a reputation for their ability in construction and they are called when there is a need for them. They receive some food in exchange for their labour. Often the wife and head of the compound's closest kin are invited to take part. In the Boussoum community (a group of the Fali) building activities are restricted exclusively to the family. (J.P. Lebeuf, 1961, p. 182).

Building construction is a co-operative effort by the future inhabitants of the compound and their kin. The division of labour among the Dagomba follows a simple pattern: the men build the walls and lay the roof, the women apply the surface finishes. (L. Prussin, 1969, p. 57).

Among the Fali, men carry out the heavier tasks, women mainly gather and transport materials, clay and straw to make the medium size torchis (roundish, long wet mud blocks) used in the cylindrical walls, stones for the flooring, thatch for the roof. They also make and place the hearths and polish the edges of walls. Children take part in minor operations, such as building small dividing walls. (J.P. Lebeuf, 1961, p. 181, describes in detail the division of labour by age and sex).

When the building season comes and the necessary rituals are complete, the construction process begins. The building season covers approximately 6 months, from October to the middle of April. Often provisional structures are built before permanent huts are constructed. The straw and wood necessary for the construction are

assembled from the moment they are wanted. Availability of water is essential for building, thus it is at hand. A sufficient quantity of earth is excavated from the nearest barrow pit and transported to the building site. Here the earth is put in heaps of approximately 80 to 90 cm high; water is added and the mud is kneaded until it has the consistency of mortar. Straw is added and mixed with the wet clay. These operations are carried out by hand. A helper makes a kind of roundish wet mud blocks. They are 40 cm long and 9 cm in diameter. They are kept under a wet straw mat until the masonry* work starts. Meanwhile, the ground is cleared from vegetation and stones.

The dwelling and other hut plans are marked by using a central rod. A man holds the stick in the centre and someone else turns around and with his finger makes a track which will guide the construction.

Lebeuf (1961, p. 183) describes that in the northern highlands** a bed of stones is laid down over the track drawn; they will be the base of the masonry work. In the case of granaries, a second row of stones is laid down and an isolated stone marks the centre of the granary hut. In some communities a foundation of the house is dug about 50 cm deep to penetrate below the loose top soil. (Oliver, 1971, p. 6).

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* Masonry is traditionally identified with 'stone and the craft of stone wall building, including the preparation and the fixing of the stones'. In some countries (e.g. Scotland) masonry includes brickwork and laying tiles, and also is identified with some modern wall building processes. (John S. Scott, 1964, p. 219). Here 'masonry' is used to mean the wall building process in general, in this case of clay and straw mix, used without moulds.

** In the north-west of Cameroon, where some of the Fali have settlements.

The circular mud walls are built up tier upon tier with moulded cylinders or balls of wet mud. In order to get equal thickness around the wall, they are pressed upon using both hands. No tools are used, nor is there internal reinforcement in the walls*. (J.P. Lebeuf, 1961, p. 184).

Using the same material, Fali sleeping rooms and kitchens are furnished with built-in elements: shelves, hearth walls, beds, low tables used for pounding and grinding foodstuffs, small tables, etc., all shaped plastically into curving forms and connected in such a way as to give the impression of being part of a single block. Yet the process is the same: all are built by adding piece by piece of wet mud.

The conical roof is made on the ground except when the building is bigger. Afterwards is it placed on top of the round wall and lashed onto a radial framework of rafters. The roof production process has been well described by Labelle Prussin in relation to the size of hut units:

> "After the walls have been raised, a radial system of rafters is set into the top course of mud. Tied at intervals with a concentric series of plaited thatch rings, the rafters form a conical roof frame. Where the span is too broad for the rafter length or strength, as it often is in the antechamber, the apex of the roof is supported by a central post. If the antechamber is large, particularly in the residence of the village dignitary, a framework of four or six posts, to which a system of crosstier is laced,

*Labelle Prussin, 1969, pp. 29-30, describes this process as 'wet-wall', or 'puddled mud'. Occasionally a different technique is employed: old walls are knocked down and dry, broken clods are used as 'bricks', wedged in place with mud mortar. Oliver, 1971, p. 6, referred to a similar process, but the 'bricks' are made for this purpose and shaped like circular cones. They are left to dry in the sun for at least two weeks before using them. Occasionally, balls of wet mud are used in the ordinary building process.

> forms an internal supporting ring. Finally, bundles of thatch are placed in overlapping layers over the conical roof framework".* (L. Prussin, 1969, p. 30).

If mud wall structures are not maintained, they last only four or five years (L. Prussin, 1969, p. 30), therefore huts have to be repaired annually. The mud wall dissolves under the onslaught of heavy downpours in the long rainy season. The strength of a mud wall lies in compression but the maximum compressive strength can be achieved only if structural continuity can be maintained. This is possible only if the mud wall is made impervious.

Impervious walls have not been found in the Fali settlements but they are used among the Dagomba, in a special manner in the Konkamba** compounds where wall and floor surfaces are treated with a wash that contains lime in addition to the more common cow dung. This treatment offers an impervious quality to rain.

Labelle Prussin (1961, p. 30) observed that in rectangular*** room units deterioration takes place even more rapidly. Initial disintegration takes place in the corners followed by collapse of the walls. Wet-mud wall construction is more appropriate and resistant in circular forms, thus circular huts have a technical reason to exist.

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* Fali and Dagomba people never used mud structurally in roof construction. Mud is used in dome construction in northern Nigeria and in northern Cameroon (Mousgoum village). In primitive communities from these regions roofs are either thatched or framed with horizontal timber systems over which mud is merely a finished surface. See L. Prussin (1969), J.P. Lebeuf (1961), E. Guidoni (1978) and S. Denyer (1978).

** Konkomba Hamlet is one of the six groups investigated by L. Prussin (1969). See introduction to this chapter.

*** Among the Fali all huts are circular; the compounds of the Dagomba contain one or two rectangular huts. See Figures 3.1 and 3.2.

The constant building production and repairs indicate that it is an important activity for the family. They must be secure to shelter everyone and as well as to store what is the interest of all (e.g. grains, tools, animals). In addition, by employing the same materials and techniques, they foster the perpetuation of skills and the continuity of the architectural morphology.

This architectural morphology represents unity in time and space not only with the people of the place, but it also appears as an extension of the landscape, representing people's vision and conception of the unity of man and the earth. These features are found in most of the 'primitive' architectural processes.

The economic function analysis

The following analysis is one of the economic functions in the 'primitive' architectural process and is based on the previous description of the Fali and Dagomba settlements.

The architectural production process is a partial view of the 'primitive' economy as a whole* and is a process by which society provides shelter.

Any institution, say a family or a lineage order, if it has material consequence for providing society with shelter and related products,

*The 'economic activities' of the 'primitive' societies have been identified as following: hunting, agriculture, animal husbandry, fishing, gathering and handicrafts. Among the communities under consideration, agriculture, animal husbandry and handicrafts are the dominant activities; the production and maintenance of huts fall under handicrafts. (See: Lebeuf (1961); L. Prussin (1969); C. Meillassoux (1964) in E. Terray (1972) especially.

can be placed within the economic architectural function and be part of the housing production process. This is the case of the 'primitive' architectural process and so the roles, intentions and direct relationship with the partial and end product are taken into consideration. The purpose is to identify the type of operations and resources and the relationship of the transitional and end products with the labourers (actors in the process).

The building process constitutes several ordered series of operations:

1. clearing, levelling and marking the ground;
2. excavation and disposition of earth;
3. kneading the mud and preparation of mud-blocks;
4. masonry work (wet-mud walling);
5. roofing - placing rafters and thatch or building the roof and placing it. 'Basket making' activities are included here*.

These sets of operations are a direct appropriation of nature and of the finished transitional products (e.g. mud-blocks, mats (prefabricated) roofs, etc). They are handwork. The only motive power is that of human hands for any building operation and basket making. Direct human effort similarly serves to move, lift and place the handmade thatch roof.

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*Basket making activities include thatching, as well as the production of mats which have several uses, e.g. as a roof over the yard (Fali), as curtains in entrances to huts, or for laying down inside or outside the huts, etc. Thus basket making takes substantial work along the building process and use.

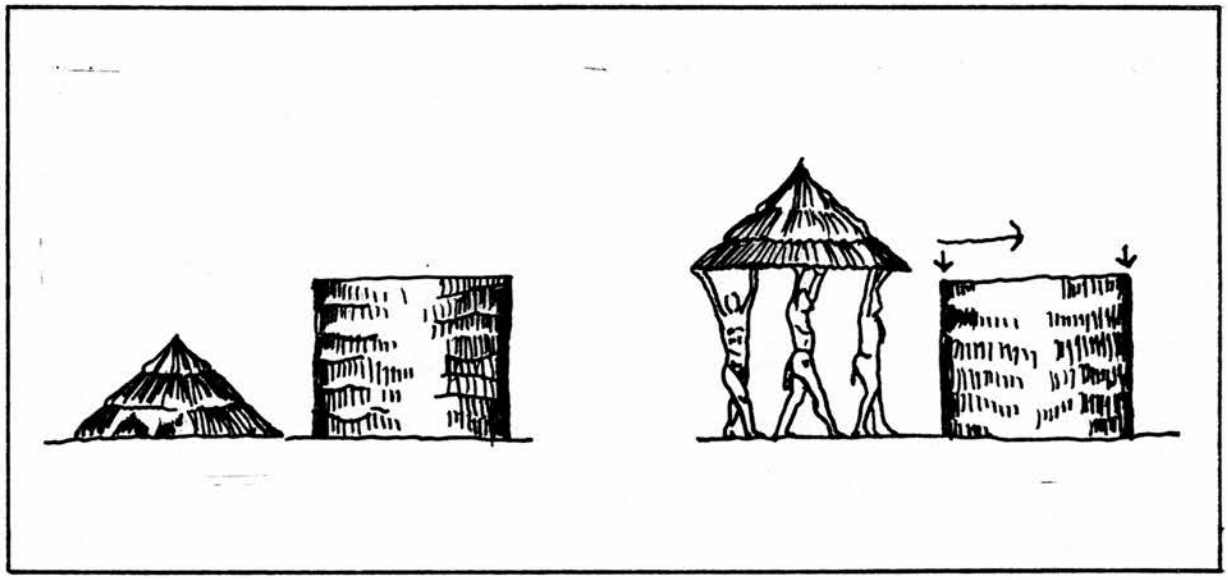

Figure 3.9 Placement of roof among the Fali.
Source: J.P. Lebeuf (1961, p. 195).

Human hands are the instrument of labour*; any tool used is of an assisting** character (different types of hatchets are utilized among the Fali - see J.P. Lebeuf, Chapter I). The transformation of nature; raw materials, into transitional or end products is done through simple manual operations; that is the case for instance of the transformation of earth, water, and straw into mud and by relatively simple operations, through masonry work, mud is transformed into round walls. Similar simplicity of work is observed in the transformation of wood, straw and bark*** into thatched roof.

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* The characteristics of the labour process are tabulated at the end of this chapter under the economic function table.

** Tools and machinery in other building production processes become a direct instrument of labour. Thus the appropriation of nature is not direct any more. See for instance the economic function of the Government housing process (6.3).

*** Bark is often chewed in order to make it more flexible. (J.P. Lebeuf, 1961).

The sets of operations in the productive process are complementary and unitary, rather than decomposed by an elaborate division of labour. The same person or team can carry through the whole process from the extraction of the raw material to the formation of the finished product. That is the case for 'basket making' and masonry work, although with some significant differences; basketwork is a masculine activity and does not require co-operation; a single artisan performs the operations in all its stages. Masonry work, and all complementary processes by which walls are built, require in one stage or another, simple co-operation. These operations are performed by men, women and children. For each major or complementary operation is necessitated a relatively simple technical knowledge. The division of labour is likewise simple and predominantly a division of labour by sex.

Kinship relations dominate and play a special role at the compound production level. The family unit can be regarded as the unit of production* in which simple co-operation takes place. This system of production binds together the heterogeneous class of direct producers, most of whom are not yet separated from their means of production, neither from the consumption of their product, means and ends are unified.

Means of production are owned collectively, but a single individual,

*This form of production unit is not unique in 'primitive' societies, neither the most important or dominant; it falls within a second, subordinated mode of production. In other 'economic activities', e.g. in hunting, agriculture, the production unit is the production community, and the form of co-operation is complex (see C. Meillassoux, 1964, in E. Terray, 1972). In terms of building in some communities such as that of Melanesia, the chief's houses and sacred canoe houses are built by the village as a whole and are the concern of the village. (A. Rapoport, 1969, p. 3).

the head of the compound, holds them together on behalf of the group. In tribal societies individuals relate each other as co-owners. Access to natural resources is typically direct; anyone can take them freely. Land is a plentiful resource; on the one hand there are no land restrictions affecting architectural form, on the other there are no classes of the landless or of the shelterless.

## 3.6 CONCLUSION

This study is of a typical example of a 'primitive' architectural process. Architecture is more than the physical building, and so the architectural process is more than just the building process. A case study of architectural processes is not a detailed analysis of the building process, but rather a comprehensive study of the factors affecting the process of architectural production and the transformations of its products. The primitive architectural process is associated with 'primitive' societies. The case study has referred to Fali and Dagomba cultures and their architecture. In 'primitive' societies such as these, architectural complexity and each of its blended parts seem to be ecologically balanced. Several cultural environmental aspects have been investigated in order to try to understand the intrinsicality of the balance between nature, society and building. The study of this totality has been attempted, and the method followed consists of the identification of the structure of the 'SCAPEB' architectural functions. These are environmental levels and/or relationships between 'elements' which through the building object and/or process their connectivity is mediated. Most of the architectural functions have been studied,

though emphasis has been put in discovering the essence of the economic function. This does not mean that the economic function is the most important of all; it may even be subjected to other functions. But this indication of subordination of the economic function appears, at this moment, difficult to identify. (For this issue see Chapter 7).

The characteristics of the architectural functions have been described before in this chapter (and organized in tables at the end of it). Their essential features are summarized below in order to draw further conclusions.

1. The Political and Behavioural Functions (Fali and Dagomba): The social structure is represented by and segmented into kinship relations. This institution takes two forms of familial units; monogamy and polygamy. Individual members of the family and the group in its totality interface space according to their cultural patterns of behaviour (Behavioural function). The family unit composition, in any form that it may take, has a spatial correspondence. The correspondence between both functions, mediated by space and the production process, is identified at two instances of the spatial arrangement: (I) Transitional,and (II) Transformational. The former relationship is of a static nature and it has been said to occur at a conjunction of social and spatial structures; the familial unit composition has, at any point in time, a spatial counterpart. The latter takes a dynamic form and has been identified as occurring at a concurrent change of social and physical structures; that is, size of and changes in the spatial disposition of the compound through time takes place at similar pace than the changes occurring in the familial unit.

2. Climatic and Behavioural Functions(Fali and Dagomba):
The compound's dwellers can use the interior spaces and the semi-covered or just enclosed courtyard in an alternating manner throughout both seasons and the day and night cycle. Ventilated and shaded places are provided for use during hot and/or rainy days. There are for instance both wet and dry season kitchens for alternative use throughout the year. The climate modification of buildings and the alternating use of space indicates that a synchronization takes effect between the climatic and behaviour functions.

3. The Symbolic function (interacting with behavioural and economic functions and overlapping with the political one). Mainly Fali:
The symbolic organization of architectural morphology responds to a complex and independent expression of two matrices of beliefs. The belief systems are expressed through anthropocentric conceptions, representing human sexuality and reproduction, interacting with concepts referred to living beings which represent a dialectic of cosmic polarities. The belief system of the Fali is reflected at every morphological level, from details to the territorial location of settlements. At the architectural level, the dimensioning of space and details are further expressed and reinforce this ideology through the anthropometric measurement system. These indicate that the symbolic function plays an important role in the production and organization of space.

4. The Economic architectural function (interacting with the behavioural and political functions). Fali and Dagomba:
This function constitutes the structure of relationships existing between actors, sets of operations, sets of resources and transitional

or final products. Building activities concentrate on the production of new structures and dwelling components and on their yearly reparation. They take place during the dry season. The transformation of nature into artificial space, within the primitive architectural process studied, has the following characteristics. Unlike the other economic activities (i.e. harvesting, hunting) the production of dwellings is carried out mainly by the immediate family nucleus itself. The unit of production is the family, thus construction itself is not an image of the society but of the family. At the same time, ownership and authority resemble the segmented social structures. The elder or the head of the compound, who is representative of the workteam and on behalf of them, vests their communal interests. This endowment represents both a principle of social order and an intrinsic purpose of cultural continuity.

The elements of the production process are, in general, simple. The division of labour is simple and predominantly divided by sex. Children undertake simple tasks. Similarly, most of the building operations are simple and are carried out by individual labour or in simple co-operation. All building operations are carried out within the site. Materials are 'naturally' transformed, especially into mud walling and thatched roofs. Technical knowledge is relatively simple and skills are learned at an early age. The instruments of labour are the human hands, thus the participation of people in the transformation of nature takes the form of direct appropriation. This means, consequently, that the few tools used take the character of assisting the manual operations. In addition their 'assistance' takes effect in only a few operations.

Construction is a continuous activity, so dwellers are involved in building throughout their lives. This continuous building activity responds to the demands of several architectural functions. Firstly, it is due to the dynamic demanding correspondence between the Political and Behavioural functions; especially because of the transcendence of cultural traditions. The familial unit must be housed according to changing structural relations; the spatial demarcation reflects the kinship composition at any point in time. But the continuous building activity is also due to the nature of materials built form, and the climatic conditions they integrate or counteract; if walls are insufficiently impervious they can slowly melt down during the rainy season. These conditions which are apparently disadvantageous, offer as well opposite perspectives; the plasticity of the materials facilitates easy re-cycling, and by employing the same materials and techniques, this begins to foster the perpetuation of skills from one generation to the next. In addition, these circumstances maintain the building's structural constancy and the architectural visual continuity. These characteristics, which are observable throughout the compound's organic-like growth and cycles of reproduction, are not only a response to the particulars of the economic function but are also due to the substantial demands inherent in the political, symbolic and behavioural functions. For instance, land due to its character of being both plentiful and collectively owned, does not impose strict constraints upon architectural configurations. Instead it suggests integration at various instances; it provides the chief raw material that once transformed into its second nature (the built environment), suggests a true extension of the landscape which is manifested in its visual and structural continuity.

This is possible not only due to the direct appropriation of the operational factors and resources, but also because of the total symbolic functioning of the architectural process and the architectural morphology. Here social values and evaluation convey. Also further principles for structuring the 'primitive' built environment operate; the associations between architecture and the human body and/or species of the animal kingdom (or elements of nature in other cultures) in all spatial levels, guarantee that there will be meaning in the whole and its parts. Due to this hierarchic spatial symbolic relatedness, every part has a meaning and a connection*. These conditions developed historically, as well as the belief systems that determine the symbolic organization of space. All those interacting structured principles promote the culture-architectural endurance throughout historical time and territorial space. That is why the identity, the chief characterization of the language of 'primitive' architecture, is essentially collective. It has been said that the symbolic architectural function plays a deterministic role in the production and organization of space. Nevertheless, there are a few more arguments that reaffirm the counter-balancing participation of other functions.

The economic architectural function seems to be to some extent subjected to the political and symbolic ones. Nevertheless, the relationship of the economic and political architectural functions is important to note. The dominant role of the kinship system is obviously

*E. Guidoni (1978) has written an interesting and brilliant discussion on this subject, especially in the introduction.

expressed in both the spatial distribution, within the compounds especially, and the building production and maintenance processes. At the spatial organizational level the familial unit exerts its influence upon the physical structure at both instances of the spatial arrangement, the transitional and the transformational. The parallel unfolding of society and building form, expressed synchronically and diachronically, suggest that human reproduction must be followed by architectural production. At the economic level, the family unit is the work-team. Individual labour exists mainly in basket making but simple co-operation takes the chief form. In addition, property relations and authority are vested in the elders on behalf of the group. There is an equal sharing of labour and distribution of products, at the compound and community levels, that bind the community together and thus the feeling of co-ownership spreads. J.P. Lebeuf (1961, p. 182) reported that no competition exists, nor of course, waged labour, but instead, principles of caring, gift and reciprocity operate. There is evidence that competition exists at the social level throughout the community since the number of wives and children give certain distinctions and a hint of wealth accumulation appears. Both monogamic or polygamic families compose the architectural production unit. What is particularly important is that there is a direct intrinsic link that binds producers and consumers.

The above discussion explains to some extent the nature of the balance existing between nature, building and society in this type of 'primitive environment'. It also explains why the production and organization of the parts and whole of buildings and the built environment are deeply rooted in the culture of dweller-producer.

Furthermore, because of that circumstantial connection between deep and surface social-cultural levels, the change and transformation of spatial and building form which occurs in all levels of the architectural process, are easily assimilated within the organic totality.

All architectural functions play a role in the production and organization of space. Some dominate others, but this may appear explicit once a comparison with other architectural processes has been made. For such purpose the essential features of this prototypic architectural process have been tabulated below. The comparison of various housing processes is the subject of Chapters 7 and 8.

The identification of a typology of housing processes in a capitalist society is the theme of the following chapter.

3.7 The following tables refer to the 'primitive' architectural process.

| ELEMENTS | DESCRIPTION |
|---|---|
| SPACE | a) Interior spaces are simple and uniform; cubic or cylindrical<br>b) Exterior spaces (courtyards) are simple and semi-enclosed at initial stages but complex irregular and enclosed at secondary stages. |
| STRUCTURES | a) They show a hierarchic dimensioning; size of huts are related to the dweller place in the family structure.<br>b) Cone-upon-cylinder predominates.<br>c) Structures are an extension of the landscape. |
| MATERIALS | d) Materials are locally found and simply transformed within the site. Mud walls and thatched roofs predominate. |
| ROOFS | e) Cone-thatched over rafters are common. Roofs are often made parallelly or independently to wall construction. |
| GROUPINGS | a) Building units arrangement, are ordered in circles tending towards egg shapes. Building units are concentrically directed disposed around one or more courtyards.<br>b) Compound units. These are organized following anthropomorphic conceptions at village level and grouped into four main quarters (Fali). |

Fig. 3.10 Table: Spatial Elements and Configuration.

This and the following tables refer to the Fali and Dagomba architectural processes. These are a synthesis of the description and analysis of the 'primitive' architectural process.

| ELEMENTS | DESCRIPTION |
|---|---|
| | Correspondences between both functions are identified at two instances of the spatial arrangement: |
| POLITICAL AND BEHAVIOURAL FUNCTIONS. | i) Transitional; at any point in time, the spatial arrangement reflects the family structure. So the family has its spatial needs fulfilled. |
| | ii) Transformational: changes through time of size and spatial organization reflect changes in family structure. Kinship and physical transformations take place at equal time |
| | a) Major transformations; are associated with the cycle of the monogamous or polygamous families. |
| | b) Minor transformations; overlapping with the economic function, and are associated with harvest surplus. (see tables 'development of compound at three selected stages'). |
| CLIMATIC AND BEHAVIOURAL FUNCTIONS. | The correspondence between both functional domains is identified as a coherent synchronized functioning. |
| SYMBOLIC FUNCTION, (Interacting with Behavioural and Economic Functions) | Organizational principles of build form and spatial distribution respond to two underlying matrices of beliefs reflected at every morphological level (details, huts decoration and granaries form, compound spatial arrangement, village layouts and territorial location of settlements). |
| | Spatial production and organization is influenced by the belief system through the measurement system. Thus there is certain degree of 'dominance' of the Symbolic Function upon the Economic and Behavioural ones. |

Fig.3.11Table; The Political , Climatic, Symbolic and Behavioural Functions of Architecture.

| ELEMENTS | DESCRIPTION |
|---|---|
| OPERATIONAL FACTORS: | |
| Technical knowledge, | Is relatively simple. Skills are learned at an early age. |
| Object of labour, | Take the form of natural materials simply transform, especially into mud wall and thatched roof. |
| Means of labour, | These are the hands as 'instruments' of labour. Tools are of an assisting character and are simple. |
| Sets of operations, | Building operations are simple, unitary and complementary, carried out individually or in simple cooperation and within the site. |
| WORK ORGANIZATION: | |
| Organizing principle, | The kinship system is dominant at the compound scale. |
| Production unit, | The family (mainly) is the work-team. |
| Division of labour, | Especially by sex and age. |
| Form of cooperation, | i) Simple cooperation,<br>ii) Individual labour,<br>(complex co-operation exists at the community scale). |
| Property Relations, (land, materials, tools, building units and compound) and Authority. (Political Function). | Hierarchic authority and property relations resemble the kinship system. Ownership is vested in the elder and/or the head of the compound, who is representative of the work-team. Nevertheless individuals relate to each other as co-owners. This is easily observed at the village level where ownership is considered collective. At the personal level we can say that individuals have preferential use of, or have rights over, but do not own the property. |

Fig.3.12 Table: The Economic Function of Architecture. (Interacting with Behavioural and Political Architectural functions).

CHAPTER 4

# THE STRUCTURE OF HOUSING PROCESS PROTOTYPES IN A 'MODERN' SOCIETY*

## 4.1 INTRODUCTION

Socio-economic processes and housing processes are circumstantially bound. The result of this is a differentiation of housing patterns over territory (urban/rural settlements). The identification of three housing process prototypes has been made by taking into account the organizational mode and the character of their political and economic functions. Two relations that tie the housing processes to their context are explored: the relation of the housing mode of production with the architectural product; and the connections between housing processes and the levels of the economy where they develop.

These descriptions aim to clarify the structure of housing process prototypes in a modern capitalist society; especially in a Developing Country.

## 4.2 THE INTER-RELATION OF SOCIO-ECONOMIC AND HOUSING PROCESSES

In this chapter an attempt is made to define and describe the framework and socio-economic conditions within which housing and other architectural processes evolve and differentiate in a contemporary

*For the sake of keeping some consistency in the descriptions the term 'modern' society will be used on many occasions, but also other terms with similar meaning are used throughout the text, e.g. Developing Country, neo-colonial capitalism, peripheral capitalism, Third World or modern capitalist society.

capitalist society. Also, as part of this, the relationship between the housing product and the economic system is explored by highlighting the modes of production and appropriation of housing as the chief linking factors; although it is recognized that other indirect relations of housing processes (e.g. actors; builders and dwellers as a workforce) to the economic system exist and also affect the differentiation of housing patterns and their transformations*.

Any contemporary capitalist society, characterized by large economic and political entities, also has small enterprises operating within a hierarchic social structure. The several levels of political and economic organization are reflected in the various housing modes of production. These correlations will be illustrated and discussed later in the chapter.

Large and highly organized economic and political entities predominate in the organisation of a capitalist society and occupy a particular region, within which there are groups in a state of domination over others**. The whole system is one of unequal distribution of the means of production. A few groups own and control the production, and have a definite effect in the distribution, exchange and consumption patterns. The cause of this, according to Marxist

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* These issues are also discussed in Chapters 7 and 8. The basic theoretical framework for the analysis of some transformations of the economic and political functions is outlined here. It is unavoidable to introduce assumptions or statements that appear later (in Chapter 8) as conclusions; though there the discussion is more extended and is based on both the case studies and the descriptions of this chapter and of Chapter 2.

**Conditions which are reflected in economic, political, cultural, religious and military spheres and structures. See for instance the work of Lipset, S.M. and Solari (eds) (1967) Elites in Latin America.

thinkers, have originated and evolved because of the nature of the mode of production; specifically because of the conflicts arising between relations and forces of production*.

Capitalism** as a mode of production is characterized by the private appropriation of the means of production which accumulate in the hands of, and identify a class of non-labourers (capitalists) which are distinguished from a class of labourers (workers). These conditions

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* For L. Althusser and E. Balibar (1970, p. 317), productive forces and relations of production are both relations combining together labourers, means of production and non-labourers within the mode of production. 'The productive forces constitute the connexion of real appropriation (wirkliche Aneignung) of nature, or the 'possession' connexion, while the relations of production are the relations of expropriation of the product or the 'property-ownership' connexion (not the corresponding 'law of property' which is not even an 'expression' of the relations of production, but a structure dislocated from them, a superstructure). This double articulation appears in every aspect of the mode of production, in the difference between use-value and exchange-value, and in the difference between the technical and the social division of labour, etc. While the productive forces cannot be reduced to machines or quantifiable techniques, the relations of production cannot be reduced to relations between men alone, to human relations or inter-subjectivity, as they are in the historicist ideology.'

**For a complete analysis of the capitalist mode of production see the original sources of Karl Marx: Capital, Vol. I, II and II. B. Hindess and P.Q. Hirst (1975, pp. 9-10) specified that 'a mode of production is an articulated combination of relations and forces of production structured by the dominance of the relations of production: the relations of production define a specific mode of appropriation of surplus-labour and the specific form of social distribution of the means of production corresponding to that mode of appropriation of surplus-labour.'
In the Capitalist System, relations of production define a mode of appropriation of surplus-labour in the form of surplus value (difference between the value of labour-power and the value created by means of that labour-power), and a social distribution of the means of production which are the property of capitalists, while the labour-power takes the form of a commodity which members of the class of labourers are forced to sell to members of the class of non-labourers.
For a comprehensive re-appraisal of the Marxist theory see A. Cutler, B. Hindess, P.Q. Hirst and A. Hussain (1977a and 1977b), L. Althusser and E. Balibar (1970) and L. Althusser (1977).

consequently denote, (1) that there are classes, State and politics, and (2) that the mode of production consists of the articulated combination of the economic, the ideological and the political levels*.

In modern societies, the social processes and underlying mechanisms operating within what covers the relationship between architecture and the economy (in general) characterizes the structure of housing processes.

Jose L. Corragio (1977, pp. 14-15), explains this relationship as follows:

> "We conceive spatial configuration as a manifestation of social processes, without denying that existing spatial configurations do indeed condition specific effects produced by the [social] structures."

Recent developments in this subject emphasize the correlation between spatial physical patterns and socio-economic systems**. Derek Gregory (1978, p. 75) indicated that the integration of human and physical systems is an ontological problem and not necessarily an epistemological one, and that the ...

> "... two worlds are necessarily connected by social practice, and there is nothing in this which requires them to be connected through a formal system of common properties and universal constructs."

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* A direct application of this as a method of analysis of human settlements has been made by M. Castells (1977), see below.

**See also John R. Short (March 1976) and Jose L. Corragio (February 1977), and David Harvey (1973).

Thus social sciences must inevitably represent "social structures and space economies."

Manuel Castells (1977/72), adopting the Althusserian position, proposes and develops a schema for the spatial expression of the economic, political and ideological systems in capitalist urban structures. These systems function in an overall urban system in a structural totality.

Milton Santos (February 1977, pp. 3-5), following a similar theoretical approach, asserts that:

> "... it is actually a question of a category of Socio-Economic and spatial Formation rather than a simple Socio-Economic Formation."

He then identifies the interdependency of the following categories: Mode of Production, Social Formation* and Space.

All the above works attempt, at least in part, to explain the relation of Society to Space in their totality, taking into account other functions of the human settlement, such as industry, commercial areas, agriculture, which, in a capitalist system, appear quite differentiated; in addition to other cultural manifestations and their institutions, e.g. religion, politics, the State. Consequently housing is differentiated but is also part of the structural totality.

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*'Social Formation' is a Marxist concept which may loosely be said to correspond to the notion of society. See B. Hindess and P.Q. Hirst (1975, p. 13) and (1977).

Thus there is a mutual interdependence of social-economic processes and housing processes which results in a variety of housing configurations. These represent the stratification of the quality of housing which reflects the general stratification of the population*.

Architectural (including housing) processes are linked to socio-economic processes at various levels, especially that of production and later during the long life of the building or building stock. In order to understand these relations an attempt will be made to identify, (i) the various modes of housing production, and (ii) the housing process prototypes. First, a brief reference will be made to several authors' views on the subject.

Several authors have attempted to classify the various types of housing production systems:

John F.C. Turner (1977) identifies basically two types of housing systems, the generalized structure of which develops as follows: Turner's housing process contains three sets of operations (planning, construction and management), in which three sets of actors are involved: users (popular sector), suppliers (private and commercial

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*For a systematic method of analysis of housing and urban development see: Enzo Mingione (1977) Theoretical Elements for a Marxist Analysis of Urban Development, in Michael Harloe (ed) (1977), Captive Cities. Studies in the Political Economy of Cities and Regions, pp. 89-103.

See also M. Castells (1977/72).

These studies, as well as those mentioned before in this section, though giving a valuable insight into problems of research and analysis of housing and urban development in general, do not provide the necessary tools for studying architectural problems. Nevertheless they can well indicate the structure of housing processes in a given structure. This methodology has been used here, but also other concepts have been incorporated, that is in order to classify housing processes in a developing country, which has a particular kind of modern capitalist society.

sector), and regulators (public sector and government). Each set of actors has very different interests: users mainly pursue use-values, the private sector is after profit maximization, and the government interest is to maintain public order. Out of the relationship between the three groups Turner identifies the autonomous and the heteronomous systems. The former refers to the 'self-built' or 'dweller control' housing system (popular sector), and the latter to the government and commercial sector, which is characterized as bureaucratic, based on hierarchic and centralized structures, and on 'large-scale technology'*.

Because of the generalized nature of Turner's model, the interests of various groups in the field of housing is neglected. Rod Burgess (1977 and 1978/1979) while extensively criticising Turner's views on housing, identifies at least six different groups that have interests in land and housing development. These are: owner-occupiers (or owner-possessors; when it is not yet legalized but have rights over), tenants, estate-agents, landlords and developers, financial institutions and government. These groups can only be understood in terms of their articulation in the overall class-structure. Other authors have attempted to identify housing production systems according to the level of development of the economy of the country, the combination of the public, private and popular sectors, and the size and type of firms. For instance, Maria T. Pavlidou (1977, p. 126) identified the following type of contractors for any developing country: large

*For an extension and application of Turner's concept of housing see Thomasz Sudra (1976), a well-documented policy oriented thesis: 'Low-income housing systems in Mexico City', Ph.D. MIT. See also Peter Ward (1976) who follows a similar line of thinking.

multinational companies, large foreign companies, large indigenous companies, medium and small indigenous firms and petty contractors and artisan technicians. She emphasized that the size of the firm affects their organizational structure and management's behaviour is influenced by the organizational structure of the firm.

Sina Berkoz and Nejet Aral (September 1977) from Turkey identified four types of housing production bodies; they were listed as follows: (1) the Government agencies which are assigned certain legal duties in housing production; (2) Government controlled enterprises; (3) semi-public organizations; (4) private sector enterprises. The popular sector was not specified here.

E. Pradilla Cobos and C. Jimenez (November 1973) developed a theoretical model* to describe the various forms of production of housing existing in conditions of neo-colonial capitalist development (Third World; Latin America).

Their model suggests three forms of housing production: the industrialized form which they considered to be dominant over the dependent manufactured and self-built (or artisan) forms. They see all housing objects as being produced in terms of the functioning of the total system. What characterises the three forms of housing production is, in general terms, the level of investment, the purpose of construction (e.g. the creation of use and exchange value)** and the income groups associated with them. A correlation with the

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* Such a model was used and developed later by R. Burgess (9/1977) and (1978/1979) in order to criticize Turner's model. See also E. Pradilla Cobos (Enero-Marzo 1974) and (Enero-Marzo 1976).

**For the definition of use and exchange value see Section 1.7.

public, private and popular sectors is attempted and additionally the technological levels, labour process and interests of capital involved are discussed.

The above studies will be taken into account to analyse the modes of production of housing and the transformation of housing process prototypes. But special attention is given to E. Pradilla Cobos and C. Jimenez' work, though certain differences exist between their approach and the one proposed in this thesis*.

The housing modes of production and their products are highly inter-penetrated by, and in various levels are linked with, the economy. Housing can be regarded as a product with specific characteristics in itself, but also it can be looked at in relation to its place in the whole of the economic system. What characterises this relation are mainly the modes of production and the inherent modes of appropriation. The identification of these factors has proved highly significant as the foundation for classifying housing processes.

In order to structure the housing process prototypes we are following a similar procedure to that employed to differentiate the 'primitive' architectural processes prototypes; that is by associating in some way architecture and the economy of the society** (in this case the

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* E. Pradilla Cobos and Jimenez (November 1973) and R. Burgess (9/1977 and (1978/1979) discuss housing processes from the point of view of political economy. So some architectural functions are not considered, and they often categorize them as 'ideological'. We coincide to the same extent in the analysis of the economic function (see Sections 5.4,6.3 and 8.4). The correspondence between both approaches in terms of identifying forms and modes of production of housing, in terms of the correlation of economic levels and the subsequent dominance/dependence relation is featured in Figure 4.1. Further elaboration on the subject is not relevant to this thesis.

**The identification of Mobile/Light architecture, architecture of additions and architecture of subtraction in relation to the society that produced them, was made taking into account (i) the mode of building, (ii) the architectural product, and (iii) the chief mode of production or gathering of food. See Section 2.2

nature of the chief economic activity).

The following aspects are considered to typify the housing process prototypes in a capitalist society: (i) the housing product, (ii) the dwellers, as a group or class, (iii) the mode of production of housing (the elements of which are described below),(iv) the scale of enterprise or production unit, and (v) the association or relation of these factors with the economy in its various levels.

Accordingly, any housing process that may belong to a general prototypic set is likely to be represented in a theoretical model*, with all its links to the economic system and society.

A typical housing process, house, dwelling or building, means a common one. And so it is characterized by its quantititative repetition and its general qualities. Alternatively, we can refer to special examples though these may also be grouped if they have similarities in some architectural functions. Therefore by categorizing the housing processes we should respond to an individual or a group in terms of their class membership rather than their uniqueness.

Consequently, a typical housing object can be selected by looking at the general characteristics of the physical setting; that is the building's height, age of structures, type of windows, roofs, etc., size of lots, landscaping, street features and so forth. Physical aspects of building generally demarcate urban areas or districts.

*Such representation, in a descriptive model (Chapters 3, 5 and 6), is elucidated by the structure of the 'SCAPEB' architectural functions.

In order to relate housing to a social group, or to society as a whole, it is appropriate to refer to social classes or social groups which have certain correlations with the building process, space and built form. We shall refer to social groups (which are in general engaged in similar patterns of economic or social activity; for instance workers, bureaucrats and peasants) which because of their social status and income level may have access to or preference for, a certain type of housing. For the same reason and in particular circumstances these groups may be dwellers or builders (or deal with the production process in some way) or both.

The general stratification of the population in turn makes the location of housing itself quite distinct. Housing quality and location are signs of social status. Thus if we refer to social stratification in terms of hierarchic social classes or social groups, we can then identify these groups by their income level and to a certain extent by the type of manual or mental labour (workforce) they represent. In the housing of lower-income groups are found working class people, skilled and unskilled labourers. In middle and upper income groups' housing live a wide range of people (including, for example, professionals and politicians) who often enjoy wealthy living conditions.

A particular condition of dwellers as members of a class, with a direct relation to other production processes in any branch of industry, is the way they play a role as a workforce, because they sell their labour power to capitalists. In this sense housing and the dwellers act directly in a process of reproduction of labour power.

The process of stratification can be determined by several socio-economic factors such as the cost of housing, the political intervention of the state (e.g. provision of council housing), and the type of control over the consumption of the territory (by the state and/or by property speculation itself*).

We can assume that the factors mentioned above are reflected in some of the architectural functions of any housing process. All forces affecting the building process, space and built form will be studied when we deal with specific case studies.

What characterises a housing (or any building) mode of production, and distinguishes its production process from others, is that the product is fixed upon the land and both building and land are affected by speculation (see Section 4.3). In addition it becomes a means to secure the value of capital. It is also a peculiarity of building production processes that there is a low circulation of capital compared to other branches of industry.

The size of the production unit and the scale of production are also determining aspects that characterize housing processes and their relation to the economy at various levels. But within this specifically the various interests of capital function (e.g. financial, landed, commercial and industrial capital) as well as the modes of appropriation that to some extent influence creation of use and exchange value. These issues are discussed in Chapters 5, 6 and 8.

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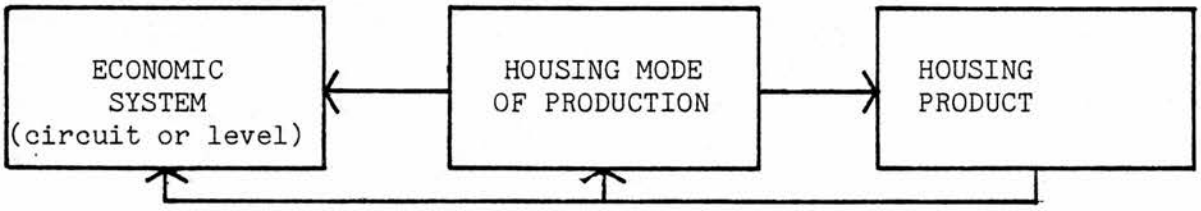
*These factors will be taken into account in order to make more understandable the relationship between architecture and the economy; or more specifically between architectural/housing process prototypes and the circuits of the economy. This will be explained later in this paper.

Therefore, the following typology of housing processes is proposed: (1) popular housing processes; (2) small enterprise housing processes; and (3) large enterprise housing processes. The mode of production of each of these pertains to a distinct economic level or circuit (see Section 4.6), and each typical housing product has its specific characteristics (see Chapters 5 and 6). The modes of housing production are part of, or can be seen in relation to, an economic sector, that is to the construction industry in a given territory, country or region (see Section 4.6). On the one hand the housing mode of production has a direct connection with the architectural product (see Section 4.5). Yet the architectural product is tied up with and represents aspects of the economic system.




4.3 THE TYPOLOGY OF HOUSING PROCESSES AND HOUSING MODES OF PRODUCTION

The selection of housing process prototypes to be studied should represent distinct social groups. This in turn should express the variations and distinctions of roles played by actors within the housing processes. It is also evident that the type and size of enterprise must be taken into account. Within the levels of enterprise we will recognize variations in technology, labour processes involved, division of labour, tenure system, and the role played by the various interests of capital within a single or a set of housing process prototypes. These variables contribute to defining the housing modes of production, within which we can distinguish three general prototypes of housing processes. They are:

POPULAR HOUSING PROCESSES | SMALL ENTERPRISE HOUSING PROCESSES | LARGE ENTERPRISE HOUSING PROCESSES

For each one of these general housing patterns we have a number of prototypes of housing processes. Some of these will be illustrated later (in this chapter and in Chapters 5 and 6) once we have understood the nature of their relationship with the economic system of society.

The three housing patterns have been differentiated by taking into account the characteristics of the two housing modes of production, which can be identified in capitalist societies of the Third World.

Specifically, housing mode of production means manner of building; the way housing is produced. The particular combination of its elements turn into two distinct modes of production, which are associated with two economic sub-systems.

The production of housing results from the articulation of three elements:

1. Land which is built upon.
2. Building materials and tools (and machinery); and
3. Elements incorporated in the construction of the building, namely the application of mental and manual operations to the basic materials/objects to produce housing.

These elements exist in a given structure and the housing building process can be described as a complex interaction of operations and

resources in which men, materials, tools, money, energy and land are involved*.

From the articulation of these elements emerges the characterization of a particular mode of production. Though we must consider that any housing production system has three aspects which in turn specify the articulation of the elements which were just mentioned.

a. It is based on labour process (manual and mental) which is a combination of labour, tools and raw materials (and/or transitional prefabricated products, e.g. bricks).
b. It comprises decision-makers or persons in authority within a structured unit of production.
c. It specifies the ownership of the land, the materials, the tools and of the product.

Summing up: the articulation of land, building materials and elements incorporated in the construction of a building for any architectural and housing process comprises three aspects. Any housing mode of production is based on the labour process; it comprises decision-makers in authority (within an organized body) and it specifies the ownership of the means of production and of the product**. These concepts are applied specifically in the descriptive models of Chapters 3, 5 and 6.

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* John F.C. Turner argues that housing-urban infrastructure must be considered as part of housing production for this is an important issue in upgrading some housing areas and as such should be dealt with in policy making (in personal discussions, March 1980, London). This observation is taken into account, though implicitly, in the descriptive models of the popular and government housing processes; Chapters 5 and 6 on the urban level of agglomeration, Sections 5.2.1, 5.4, 6.2.2 and 6.3.

**This description has been developed by the author after considering the idea put forward by Manuel Castells (1977, p.151) and R. Cresswell and G. Hanning (June 1976, p.10). Implicitly, the distribution exchange and consumption of the product and so the creation of use and exchange value characterise the mode of production.

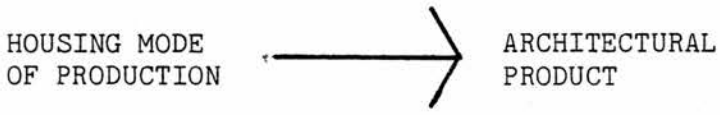
Within the concept "housing mode of production" two architectural functions are mainly involved*. These are the economic and the political ones. While the economic function refers generally to the building mode, the political function is identified with the type of controlling agents. The identification of the political function as 'controlling agent' may partly refer to the role played by the participants in the architectural process within its main activities such as design, financing, construction, management and also within the tenure system. This applies differently for each one of the three housing processes identified. These issues will be studied in more detail later in this chapter and in Chapters 5 and 6.

## 4.4 THE HOUSING MODE OF PRODUCTION AND ITS PRODUCT

The labour process can be described as sets of mental and manual operations acting upon given sets of resources. These operations are arranged in time and space in a predetermined manner. Thus the operations have at every stage and in the overall process, specific objectives or intentions. The intentions behind every operation or activity, come to exist in a concrete way after their incorporation along the processes. Partial and end products show the intentions of production. For instance the goals of the producers in relation to these products could be to achieve a cheap and functional house. It may also involve a desire to use the house, creating a use value in the first place, or the house may be produced for selling, thus creating first of all its exchange value (see Section 1.7). These

*Certain ideological aspects, such as belief systems and cultural codes or information systems, are related to either the political or symbolic functions and thus play a central role in production.

objectives particularize the type of producers and dwellers but also they characterize the building process and often say so much about the housing built form. Reversing the process of analysis suggests that the architectural product and its transformations often shows the characteristics of its producers and of the structure of its processes of production. Though in this case a previous knowledge about housing environments and production processes might be necessary. However a direct relation of the housing mode of production and its architectural product is indicated.




## 4.5 HOUSING PROCESSES AND ECONOMIC CIRCUITS

The characterization of the architectural functions determines the nature of any housing process. Yet the architectural functions change in time and space and so a number of variations of basic prototypes of the housing process appear. This is to say that housing processes are diversified. They differ quantitatively and qualitatively over space. Urban space in developing countries looks discontinuous and unstable due to the many forces acting upon it. Many contrasting housing configurations are settled in a mosaic-like urban environment. Architecture that developed in history is still in use and often exists next to housing processes of the present. Architectural differentiation and particularity are the direct result of these historically-determined variations.

Urban space, where housing configurations are set, as well as other

interacting land uses (for instance industry, offices, commercial activities), is organized and constantly re-organized within a global matrix of modernizing forces. These forces often affect urban networks and housing processes. Forces of tradition and socio-economic constraints also manifest their impact on housing environments. Many influences and polarizations emanate from different decision-making levels. We can relate these operating causes and effects with two distinct economic fields.

Housing can be regarded in relation to its place in the whole of the economic system. Our concern here is to be able to identify housing sectors* and housing processes within the economic system of a modern capitalist society, especially in relation to the Third World. Therefore any housing process in a given urban/rural context should be easily recognizable.

Any housing process can be placed at a certain economic level. The three general housing patterns put forward (the popular, small and large enterprise) belong to two distinct economic fields. These have been described by Milton Santos (1979) as the two circuits of the economy; and he refers to them as the "lower" and the "upper" circuits**. He describes their characteristics in the following terms:

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* 3 housing sectors are generally identifiable; these are the popular, private and public sectors.

**The two circuits of the economy have been said to have been discovered and described by many authors. Nevertheless they have been put forward in well founded theoretical ground by Milton Santos (1979) The Shared Space. The two circuits of the urban economy in underdeveloped countries. Methuen & Co. Ltd, first published in 1975. L'Space Partage, by Editions M.Th-Genin. See also an article by the same author (February 1977) Society and Space: Social Formation as Theory and Method. Stephan Slander (tr) in Antipode, Vol.9,No.1, pp. 3-13.

> "In underdeveloped countries, due to the relative immobility of factors and great income disparities, there is a tendency to a double polarization. Linked to production, there is a vertical polarization which induces a spatial hierarchization of economic activities. Linked to consumption there is a horizontal polarization at the local level. Two distinct tendencies in consumption, linked to class structure, correspond to two distinct trends in manufacturing, trade and services. There is a coexistence of homologous activities at two different levels. Every place is the field of coexistence of two polarizations, two concrete modes of production." (1977, pp. 49-50).

> "Each city has, in reality, two interrelated market areas, corresponding to each circuit. Everywhere, even in the most advanced areas of underdeveloped countries, one can discern, side by side, the existence of these two economic sub-systems." (p. 55).

Enormous income disparities are manifested: (a) at the regional level in a hierarchical employment structure; (b) at the local level where the coexistence of the two economic systems, each operating on a different level, can be felt. This can be seen in housing configurations and felt in the housing productivity and housing submarkets. For instance housing production (in Mexico) by the popular sector, between 1970 and 1976, rose to 2/3 (65.5%) of the total production*. This sector is permeated by the lower circuit. The public and the private sectors operating in the upper circuit produced the remaining third, with 18% and 16.5% respectively. This implies that a great part of the population have no access to the housing market (traditionally or officially understood)**.

Further characteristics pertaining to both circuits in relation to

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* Sahop (1977) Diagnostico y Politica de ca Vivienda. Non-published paper.

**Orville F. Grimes Jr (1976) reported that the cheapest new housing being built by 1976 was not affordable by the poor; 'under reasonable repayment terms and at an interest rate of 10 per cent, one third to two thirds of urban families cannot afford the cheapest new housing...". This study was carried out in six cities: Ammedabad, Bogota, Hong Kong, Madras, Mexico City and Nairobi.

housing are described below*:

Milton Santos (1979, p. 20) asserted that:

> "The fundamental differences between the activities of the upper and lower circuits are of a technological and organizational nature."

These differences can be discovered by looking at the housing mode of production, at the three general housing patterns put forward. This issue will be brought up in the case studies. The upper circuit is a direct result of technological modernization, and its most representative elements are monopolies in general and large scale housing production in particular. These tend to grow in size and small firms tend to disappear**.

The lower circuit consists of small scale housing activities and is especially concerned with the poor population. There are often close links between the built form of their housing, and its region. Technologically:

> "The upper circuit uses an imitative imported, high-level and capital intensive technology; in the lower circuit, though technology is labour-intensive and often either indigenous or locally adapted, it often has considerable innovative potential." (p. 21, 1979).

In terms of employment variations in the upper circuit, wages are the

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* It is necessary to point out that Milton Santos did not relate housing activities to his Economic Theory of the circuits, but it is understood that it does in fact cover it. Yet he pointed out that it is wrong to identify 'shanty towns', and 'gettos' [in developed countries] with the lower circuit because he observed that goods produced in the upper circuits, for instance TV sets, were being consumed in these areas (see pp. 29-30: 1979). Also entrepeneurs living in these areas operate in the upper circuit.

**This phenomenon has been registered in Mexico, see CNIC (1977) Importancia Socio-Economica Actual y Futura de la Industria de la Construccion. CNIC, Mexico.

dominant form of labour relation. Skilled and semi-skilled labour in construction is partly absorbed here. This can take the form either of a permanent or, most commonly, of a temporary contracting or sub-contracting basis.

Employment in the lower circuit is rarely permanent and its remuneration is often at or below the subsistence level.

> "Employment often takes the form of a personal agreement between the hirer and hired, though family and self-employment are of greater importance." (Ibid)
>
> "The average number of persons employed per enterprise is low; however, the number of production units being large, the total number of employees is considerable; the lower circuit thus provides employment for both the urban poor, and unskilled migrant workers." (The Shared Space, p. 22)*

In relation to expenditure, the production of housing in the upper circuit has very high fixed costs, which usually increase in proportion to the size of the firm or institution. Housing production in the lower circuit has almost no fixed costs, neither are direct costs very high. For the former housing such conditions increase the cost of production. High quality might be reached with the rise of investment. For the latter its major effect is seen in the restricted architectural functional values. (See summary and conclusions of Chapters 5, 6 and 8).

The modes of production of housing of the two economic circuits are

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*The observations in these quotations refer to economic activities in general; nevertheless they are valid for the housing sector. For information specifically related to the housing construction industry see: C. Araud, G. Boon, V. Urquidi and P. Strassmann (1973), Studies on Employment in the Mexican Housing Industry, OECD, Paris, and Dimitri A. Germiois (1974), Labour Conditions and Industrial Relations in the Building Industry in Mexico, OECD, Paris.

established in different cities according to the conditions peculiar to each circuit. Specific combinations of sets of resources and sets of operations appear. Similar work processes get different degrees of modernization and particular values for capital and labour, in which cases the upper circuit becomes dominant. (See Milton Santos (1979) p. 50).

The feasibility of housing production by small and large scale enterprises (of the upper circuit) seems to increase with the size and functional level of the city, for the following reasons: the more important the city, the greater the number of professionals, entrepeneurs, civil servants and salary-earners in general, and consequently the larger the market for the activity of the housing enterprises to take place. Incomes tend to increase in relation to the importance of the city and the capacity to attract industry; hence the number of consumers of modern goods increases, as well as the institutional credit and private bank loans for building. Modern financial systems for construction tend to proliferate*.

The construction industry** in general and the building industry in particular becomes a field of activity that connects the two circuits. It links strongly both economic systems; construction absorbs unskilled, semi-skilled and skilled workers. Full, seasonal and temporal employment is generated. In the upper circuit most labour is provided by lower-income groups. In the lower

---

* These assertions are the author's observations and deductions from literature; see for instance J. Friedmann and R. Wolff (1975) and L. Unikel in M.S. Wionczek (1971) in which are described the urbanisation process of Third World cities.

**We are referring to the construction industry which involves both circuits and not only what has been traditionally or officially understood.

circuit building materials and tools are purchased from the upper one's production. In addition, land and energy rates accrue to the government which in return builds, directly or indirectly, the urban infrastructure.

According to Milton Santos (1979) money lenders, so common in developing countries, are the most important link between both circuits. They operate mainly in the lower system, yet they may use banking systems and/or invest in profitable business.

We should now extend further the identification of both circuits in relation to the particular housing processes.

The popular housing processes are the province of the lower circuit. Here we find the prototypes of several housing processes; for instance among low-income people's housing environments we find squatters and other dwellers/builders which can be identified with self-help housing, mutual aid and the continuation of the craft-guild tradition and also small building teams as sub-contractors*.
In the upper circuit we find housing processes associated with large and small scale enterprises. The former comprises Government housing, housing by developers and cooperatives. It also involves large scale multinational companies, large foreign and large indigenous companies (see the first part of this chapter). As regards the latter category, small scale housing enterprises comprise small architects offices and construction firms and small cooperatives and contractors.

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*See Chapter 5, Section 5.4. See A. Moreuo Toscano (1978), T. Sudra (1976) and R. Burgess (1977).

Thus the articulation of the two circuits and the housing processes is tabulated in Figure 4.1. The housing processes comprise the mode of production and its architectural product with all possible transformations. In this case we are considering that size/type of housing enterprise and the magnitude of the project are compatible. That is, the scale or level of enterprise implies a similar level of production.

By looking at the place of the housing process in the corresponding circuit we will be able to understand better the character of the architectural functions and their transformations.

## 4.6 CONCLUSION

An attempt has been made to analyse the framework within which housing processes take place in modern societies. This helped to describe the structure of housing processes in a (capitalist) Developing Country. In order to do so, account has been taken of the organizational mode of housing enterprises and informal housing production. In addition to and as a consequence of both the scope of the housing production organizations, three general prototypes of housing processes have been identified; these are the popular, small and large scale enterprises' housing processses.

In order to understand both the housing variations in space and the typological ordering of housing prototypes, two relationships were explored: (i) the relation of the housing mode of production with its architectural product. We emphasized that there are certain principles and constraints inherent in the mode of production; that

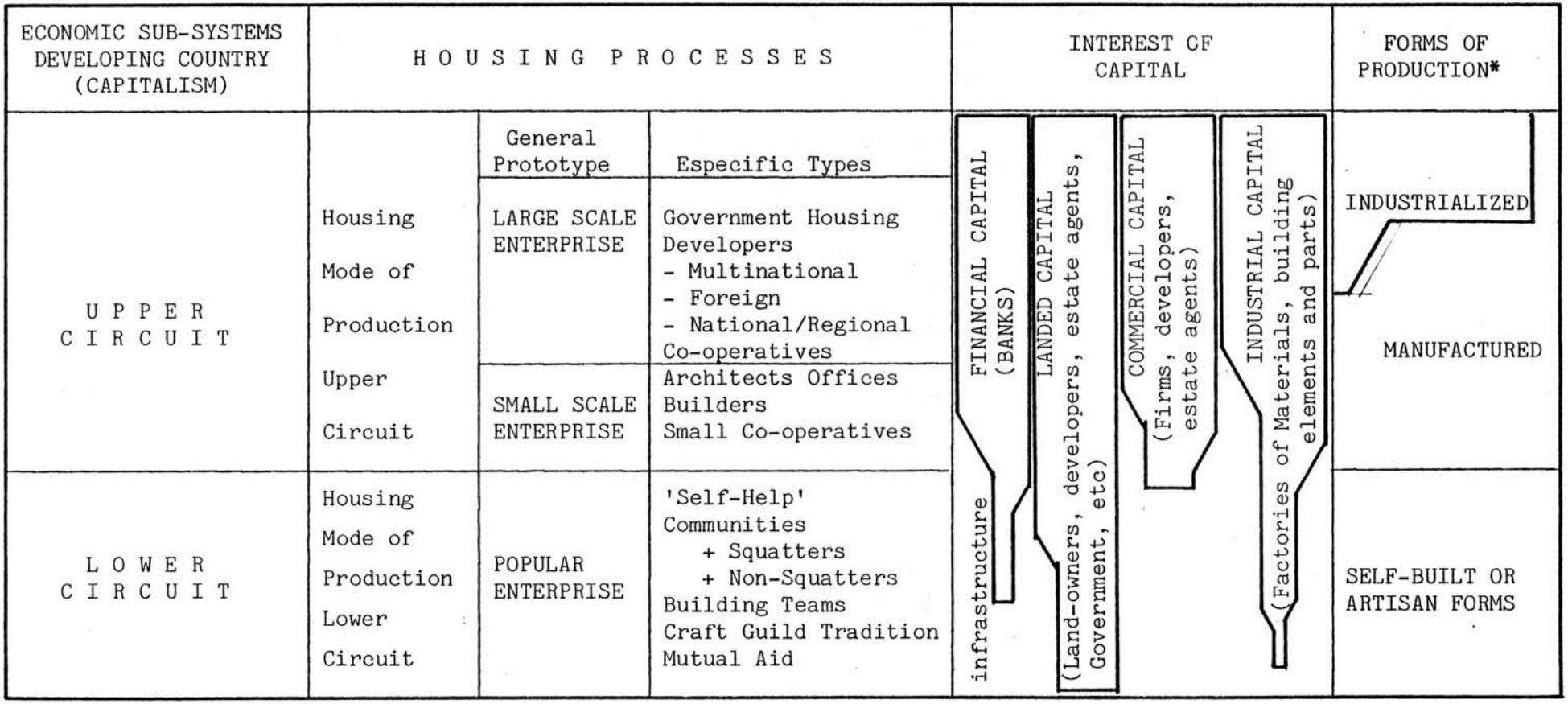


Figure 4.1. Economic sub-systems in relation to housing processes and interest of capital.

*Forms of production typology according to E. Pradilla Cobos and C. Jiménez (November 1973).

□ It indicates the interpenetration of different interests of capital (profit-oriented production and appropriation) at both economic sub-systems.

is, especially in the actors' objectives and controlling agents that determined certain aspects of the architectural space and built form; and, (ii) the connection of the prototypic housing processes with the levels of the economy. For this purpose a reference has been made to Milton Santos' concepts of the two economic sub-systems found in any Developing Country. They are the upper and the lower circuits. In the upper circuit we find the modern formal patterns of housing production and built form; that is to say the small and large scale enterprise housing processes. In the lower circuit we find the popular housing processes.

Differences in organizational and technological modes characterize the housing activities of both circuits: they are represented in the upper circuit within two levels of the housing mode of production, corresponding to two levels of organization. To these levels of organization, the small and large scale enterprises,correspond similar levels of technological manipulation and control of resources. This affirms that there is a correlation between the size of the housing or any architectural project and the size of the enterprise. Housing activities in these circuits are undertaken by Government housing authorities, developers belonging to multinational, foreign and indigenous firms, and also by cooperatives. Among the small firms or housing enterprises we have architectural practices and developers in general.

In the lower circuit, the housing mode of production represented by the popular housing, shows also a variety of housing sub-prototypes belonging to low-income groups generally. Here building techniques are often rudimentary and/or manifesting traditional traits. They

involve small scale operations but the number of housing units represent the majority of the production in the whole housing industry.

Both circuits are interdependent. This is particularly manifested in the construction industry; in the activities of construction of buildings and urban infrastructure as well as in the land and building rents. Also the interdependency exists due to the inter-penetration of the various interests of capital, at every level though in different degrees. Such conditions contribute to characterize the upper circuit mode of production of housing as dominant over the lower one*.

The interrelations of upper and lower housing circuits change with the size of cities and particular conditions of both economic fields which modify each other dialectically.More specifically their evolution expressed in space is determined by cultural, social, economic and political events.

Socio-economic and housing processes are intrinsically and circum-stantially bound at every level. The political decisions at the national level affect directly or indirectly the consolidation of settlements or housing processes or else may contribute to their deterioration. Similarly economic production and investment in one region may directly affect another. A housing process located in a depressed region or marginal area cannot be understood in isolation.**

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* These issues are explored and discussed in Chapters 5, 6 and 8.

**For this particular issue, the relation, effects and interdependence between national and local levels; or between macro-economic and micro-economic processes, see Susan Eckstein (1977), Pablo Gonzalez Casanova (1965/1970), Michael Lipton (1976) and Harold Brookfield (1975), Samir Amin (1976) and Emmanuel Arghiri (1972) for the theo-retical approach to the concentration of capital at the world scale.

The result of this interdependence is a differentiation of housing patterns over geographical space. This represents the social stratification and corresponding qualitative and quantitative housing variations. In addition, within the housing processes, manual and mental operations are directly related to economic levels and social class structure. We can assert that these conditions affect the performance of the architectural functions, thus to some extent determining that some architectural functions outweigh others.

Conceiving the two economic circuits as a framework for identifying housing processes implies a clearer disposition of the structuring of the architectural functions, thereby facilitating their analysis. Furthermore, we will be able to explain more easily the nature of housing processes and their transformations over space and changes over time.

Two housing processes will be described below: the Government housing process, which is associated with the upper circuit mode of production, will be studied in Chapter 6. And the 'popular housing process' which takes place as part of the lower circuit of the economy. The description and analysis of its (SCAPEB) architectural functions is the theme of the following chapter (5).

CHAPTER 5

# THE POPULAR HOUSING PROCESS
# DESCRIPTIVE MODEL II

## 5.1 INTRODUCTION

This chapter attempts to describe and analyse typical examples of the popular architectural process. Thus we must identify what popular architecture means. According to Enrico Guidoni

> "'Popular' is applied to the architecture of the lowest social classes within a highly stratified system".
>
> "...'popular' architecture would be the expression of the spatial activities of a group that occupies a territory in economic and political subordination to a dominant state complex or that exists within the limits of a system of unequal distribution of the means of production in a broader territory than its own". (E. Guidoni, 1978, p. 32).

Thus, what we call popular housing processes develop in the lower-circuit of the economy, and as part of this system have their own characteristics. These were studied in the previous chapter. Popular housing processes are undertaken by low-income groups and belong to a sector that includes the lowest strata of a modern urban society, in the case we are considering, the lowest strata of Lima and Mexico city. This sector is, in general, beyond the reach of organized labour and social security; the occupational composition of the sector includes domestic service, occasional workers, self-employed workers, and workers in small enterprises. Within the popular sector, or low-income urban housing in general, there are a variety of housing process sub-prototypes. A classification of these in the case of Mexico city has been made by Sudra, T. and

Turner, J.F.C. (1973) and Ward, P. (1976), which is based on their location, tenure and structure type. Reference to these housing sub-systems presented in Figure 5.1 is made in various degrees in this chapter (and in the next one reference will be made to the supply of housing by the state). Nevertheless the study puts emphasis on the description of squatter settlements primarily, and some variations of housing processes that take place within them, or have a different origin.

The following description is supported by the research done by Larissa A. Lomnitz (1977), by Peter Ward (1976) and Thomas Sudra (1976) in Mexico City, by John F.C. Turner in Lima and Mexico, and by Hanson G. Thomas (1975) in Kingston, Jamaica. It is also supported by the author's own experience and previous studies on the subject*. Particular emphasis has been put on studies by Larissa A. Lomnitz and John F.C. Turner. The former investigated a settlement known as Cerrada del Condor, located in Mexico City; the study of J.F.C. Turner referred to is that of Barriada Cuevas, located in Lima, Peru.

The information has been organized within a matrix of four architectural functions. These are the Political, the Economic, the Behavioural and the Climatic functions. Within each pair of functions an attempt has been made, in broader terms, to organize the description, taking into consideration three stages of development of squatter settlements: the incipient, the developing and the consolidated.

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*See Lechuga G., L.E. (1977), 'Housing Design in the Third World', MSc Thesis, Heriot-Watt University.

| | SUB SYSTEM | USUAL LOCATION | USUAL TENURE | STRUCTURE | SERVICES | USUAL PERIOD OF EXPANSION | APPROX. TOTAL NUMBERS |
|---|---|---|---|---|---|---|---|
| VECINDADES | Classic Vecindad | Central city (Primer cuadro) | Rent (often controlled | Often colonial palaces, sub-divided and deteriorating | Access to all services but shared | Varies 1900-1940 | |
| | Vecindad | Central city and intermediate ring | Rent('libre') | Large purpose-built, varying state of repair | As above | 1930-1942 | 2 million * |
| | Vecindades nuevas | Intermediate ring and periphery. In the older colonias proletarias. | As above | Small, 1-10 families. Varying degree of permanency | As above | 1955 onwards | |
| COLONIAS PROLETARIAS | Fraccionamientos Clandestinos | Periphery, (often in the State of Mexico) | 'Owned' by occupier - contract often invalid or confused | Varies, usually consolidating. Autoconstruction | Varies, may often lack one or all of the following: drainage, paving, water, refuse collection etc. | 1950 onwards | |
| | Colonias Paracaidistas (Squatter settlement) | Intermediate ring and periphery | Held illegally by occupier | As above | As above | 1950 onwards | 3-3.5 millions |
| | Colonias Paracaidistas - legalised | As above | Owner occupied. Some renting and sharing | Consolidating | May lack any of the services listed above | 1950 onwards | |
| | Ciudades Perdidas | Central city, intermediate ring and old pueblo cores | Rent. Often confused | Shanty, unconsolidated | Usually access to water. Limited or lack of other facilities. | 1940s 1950s | 112,000-200,000 ** |

Figure 5.1. The Popular Housing System of Mexico City
* Turner et al (1972)
**Lower estimate according to data collected by Peter Ward (1976), upper estimate that of Turner et al (1972).
Source: after Peter Ward (1976, p. 80).

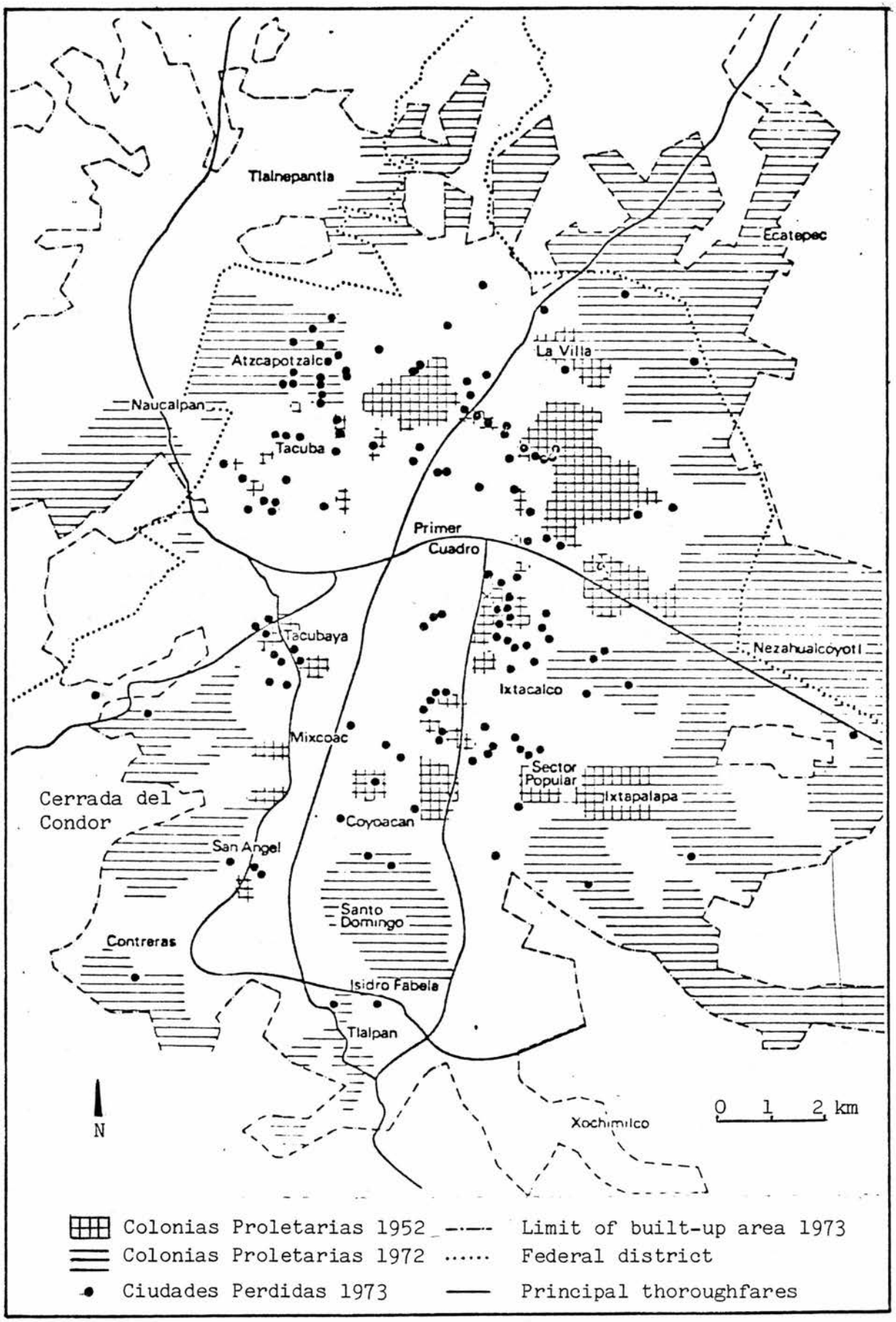


Figure 5.2 Map: Distribution of Ciudades Perdidas and Colonias Proletarias in Mexico City, 1973. Colonias Proletarias includes housing where land use was originally occupied by squatters, but also those areas which had other origins (e.g. illegally subdivided and sold). The number of Ciudades Perdidas has recently been reduced. Between 1972 and 1976, 170 settlements were eradicated. (Copevi, 1977, Vol. III, p. 115).
Source: P. Ward (1976, p. 82)

These categories of the housing-settlement process are based on the original classification made by J.F.C. Turner (1969) who proposed three levels: incipient, incomplete and complete*. A similar approach has been taken by Peter Ward (1976, pp. 271-378), but he named them 'incipient', 'consolidating' and 'consolidated'. These classifications have been made on the basis of security of tenure, the physical structure and degree of permanence of dwellings. The transition from incipient to developing is dependent upon increased security of tenure.

## 5.2 THE POLITICAL AND BEHAVIOURAL ARCHITECTURAL FUNCTIONS

The political function is related to the controlling 'agents' influencing, directly or indirectly, built form; dwelling space or building process.

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*Hanson Gerald Thomas (1975) has studied 29 shantytowns in Kingston, Jamaica, of which 10 are described in depth. From his field work he proposed a five-stage model of development: 'initial', 'transitory', 'intermediate', 'permanent' and 'assimilated', each of which is determined by the interplay of the following factors; relative location, land use, tenure, population characteristics, housing, public services, communal activities and vegetative patterns. Hanson argues that squatters develop their houses gradually in the first three stages at which time 'owner'-occupancy predominates. The tenure in the 'permanent' stage is limited to a selected few, and most residents rent accommodation. Furthermore, he says that the level of service provision is not extended in direct proportion to the population increase with the result that in the final stage ... 'assimilated shantytowns mark a regression rather than a progression in tenure security, housing and public services'. (Hanson, G.T., 1975).

Thomasz Sudra (1976) used a similar approach and so identified similar stages but looked at housing in more detail. He identified 9 sequential stages which low income housing solution types may go through. This study is policy oriented. It is a detailed application of Turner's model of housing.

The political function is identified here with (a) cultural codes and structures of decision-making expressed through Government spatial control, and (b) social institutions which support the popular architectural process and which are partially manifested in the physical distribution of space and which also affect the production process.

It is useful to look at the effects of the political architectural function at the following two levels of spatial arrangements:

1. At the urban agglomeration level: dwellings which from the start develop according to settlement layout, upon defined plots, which are organized by leaders ('caciques' or landlords) of the barriada or by the authorities. Here reference is mainly made to the development of 'Barriada Cuevas' (Lima).

2. At the room-dwelling level, and clusters which apparently develop at random. These dwellings eventually combine to form a settlement layout which follows neighbouring urban patterns. At a later stage these fall under government controls. The description at this level refers especially to the development of 'Cerrada del Condor' shantytown (Mexico city).

Both these levels will be described below, with emphasis on two stages of the housing process: the 'developing' and the 'consolidated'. In addition, transformations taking place at the household level will be described. These processes within the political architectural function determine the subdivision into plots and consequently influence to some extent the built form transformations and agglomeration principles of both the plots at the urban level and

rooms at the household level.

The behavioural function is described concurrently.

### 5.2.1 The Urban Agglomeration Pattern

In order to understand the origin of urban aggregational patterns of housing, the origins of squatter settlements are described below. A brief reference to cultural codes is made. These influence indirectly urban agglomeration patterns in popular architectural processes in Latin America.

The necessity of squatting may occur in quite different circumstances in the same city or at different stages in the life of the same family. John F.C. Turner (1971) reported that the majority of those who settled in Cuevas, a barriada on the outskirts of Lima, were motivated by their desire to escape the tyranny and insecurity of paying high rents for miserably poor conditions.

The organizers of the squatters are grouped in various organisations* previously settled throughout the city. They are in charge of disseminating the idea of having a new '<u>fraccionamiento</u>' (literally, subdivided land) for housing. The future residents of <u>Barriadas</u> or '<u>colonias proletarias</u>' (literally colony of the proletariat, it also includes '<u>colonia de paracaidistas</u>' literally 'colony of parachutists'. Mexico) would have to book their future land with the organizers by paying a small amount which is used for marking out

*which seem to be common the world over. See for instances Charles Abrams (1964) and Peter Lloyd (1979), who discussed squatting in the Third World.

lots on the site before the occupation takes places.

The organizers of the squatters find a site which was owned by a public agency or national government. They visit the place at night and mark out the lots assigned to the members for their houses; they also mark the location for streets, schools, churches, clinics and other facilities. The plans are made in secret.

By the appointed day, selected for the occupation, they have secured support from a political or religious figure and they have also alerted a newspaper. Hundreds of the members of the new barriada organizations, sometimes more than 1,000, rush in taxis, trucks, buses and cycles to the site, in the late evening or in the early morning on the agreed day. They carry with them their children, all their belongings,as well as poles and straw mats or 'laminas de carton' (sheets of corrugated and waterproofed cardboard).

The police may attempt to evict them. Mobilisation of both groups may lead to confrontations. Negotiations between leaders and authorities take place. Often leaders of the squatters are subjected to co-optation and settlers become, in total disadvantage, politically and legally subordinated*. Once the barriada has established itself, it grows until it has used up its available land. This may be during the months following the invasion, or it may take several years. The period of consolidation for uncontrolled settlements may take from 5 to 20 years. The period of consolidation for each house varies. Its completion is determined by several socio-economic and

*See Wayne A. Cornelius (1975) Politics and the Migrant Poor in Mexico City. Stanford University Press; Peter Ward (1976) In Search of a Home. Social and Economic characteristics of squatter settlements in Mexico City. Liverpool University, PhD Thesis.

legal factors. One of these is the security of tenure of land achieved by the consolidators. After tenure is secured, the level of income determines full consolidation (in terms of degree of housing quality). (P. Ward, 1976 and T. Sudra, 1976).

The organization of space at the urban level is originally made by the squatters' leaders. Later it is likely to undergo slight modification by government regulations and plans, but the type of settlement layout (like that of Barriada Cuevas) retains generally the original features of the spatial urban ordering. The agglomeration pattern at the urban level develops from a rigid model of spatial organization. The agglomeration pattern consists of clusters of rectangular plots ordered within a rectangular grid-iron, thus conforming to a particular urban form. In general this urban form consists of streets laid out in a grid-iron pattern centred around a central square. This urban form is widespread in Latin American towns and cities. It has been developed historically and not only conforms to popular architectural housing processes but also penetrates all socio-economic spatial levels in any given town. Its roots lie in the colonial culture which generated this distinctive, and for that time new, urban form*.

*Spanish cities in Latin America were planned on a standard land use pattern, originally based on the 'Law of the Indies'. Streets were laid out on a grid-iron basis centred on a 'zócalo' or main square. Around this square were concentrated the principal religious and administrative buildings and the houses of the Spanish elite; the poor lived nearer the edge of the city.

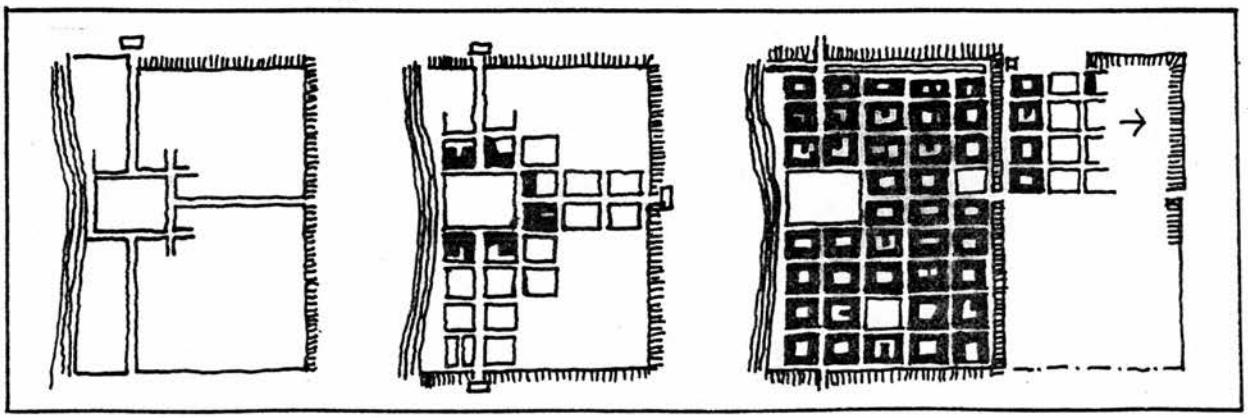

Figure 5.3 Growth in the colonial city. Source: After Lars Lerup(1977)p.51

(cont)

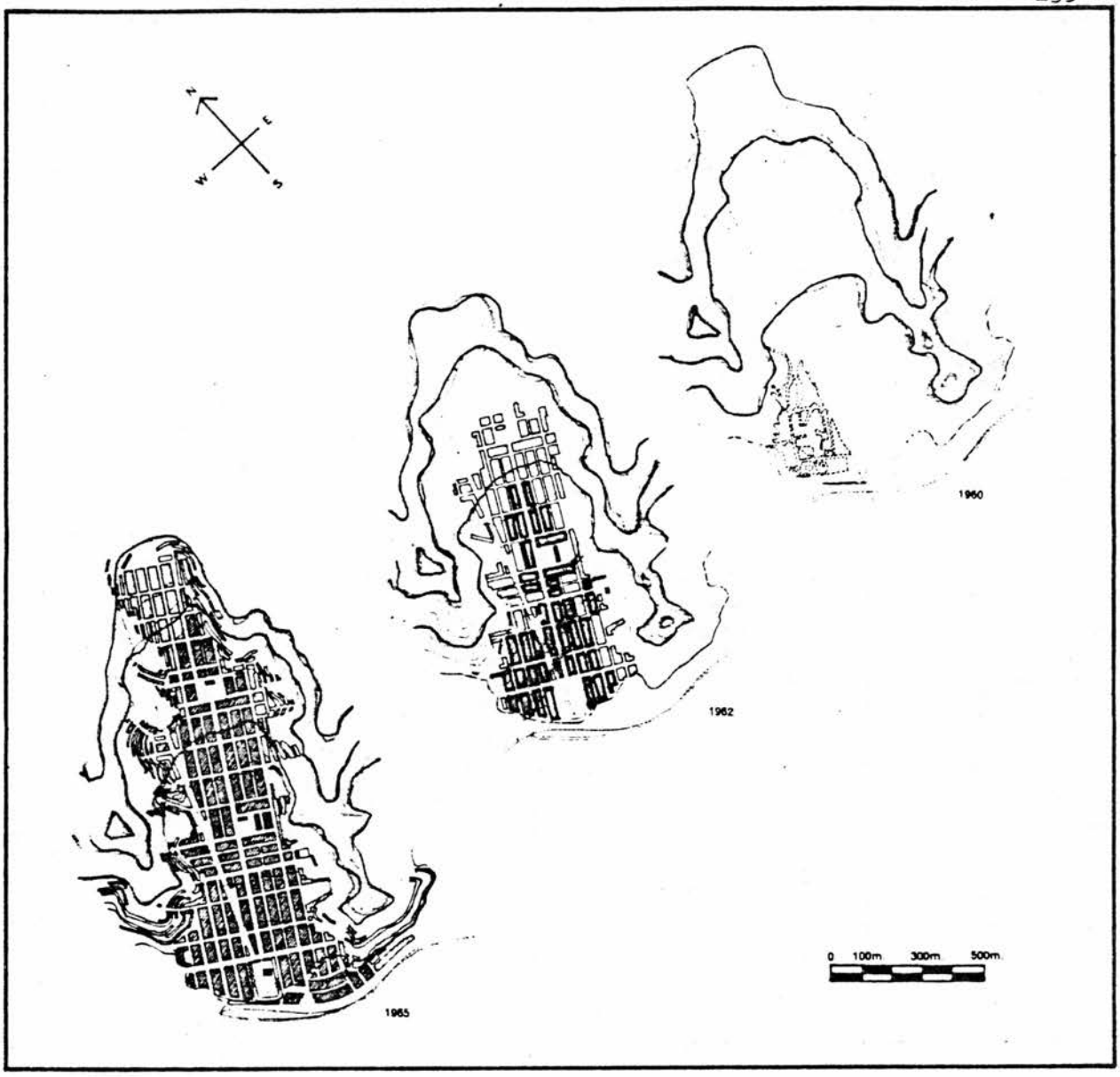


Figure 5.4 Map. Cuevas Development.

"A land use survey made in June, 1965 revealed a total of 218 retail shops (mostly very modest businesses of more social than economic value) and 14 artisan workshops. Dressmakers', dentists', and electricians' signs, among others, can be seen today. A sample of the dwelling structures surveyed showed that permanent construction had been started on 80% of the plots and 42% had walls completed to roof height. Only 9%, however, had a finished first floor structure and only 2% had started second floor structures.

In 1965 Cuevas became the centre of a new municipality incorporating two adjacent settlement areas. In November, 1966 municipal elections were held and, administratively, Cuevas became a fully incorporated part of the city. Physically, however, much remains to be done. No public utilities are operating yet, only a few houses are structurally complete, no roads have been paved, and there is not a single tree because water is not yet piped in."

Source: J.F.C. Turner (1971, p. 76).

| Community Facilities | Public Utilities |
|---|---|
| **Stage I at 1-2 years (Incipient)** | |
| A local market and many small stores and bars are established at the time of occupation; primary schools are also organized and put into immediate operation (with volunteer or locally contracted teachers if necessary); a chapel or shrine is set up and neighbouring priests are invited to officiate. | Initially water for domestic and construction use must be brought by lorry and sold by the 50-gallon drum (at about 5p (12 cents) per drum). No other 'utility' is provided at this stage. |
| **Stage II at 4-5 years (Developing)** | |
| Commercial facilities are expanded and complemented by artisan workshops for domestic and building trades; TV sets with private generators provide local cinema services; a parish centre is often instituted providing many additional religious services; locally instituted primary schools are adopted by the state and additional schools are provided; medical treatment will be provided by visiting doctors and dentists and a local pharmacy will be established. | Considered and occasionally successful efforts are made at a relatively early stage to obtain water mains and mains electricity; more frequently water continues to be brought by lorry but local electric generators are set up to supply immediate neighbours. |
| **Stage III at 10-12 years (Consolidating or Consolidated)** | |
| More specialized commercial facilities are established if the population is large enough - for example, commercial banks, specialized stores, cinemas, restaurants, etc. Local workshops will develop into small industries, for example, for the manufacture of furniture, delivery tricycles, etc. Day nurseries are often set up with outside agency help and clinics fully installed; all professional services will be available locally. | Water mains, mains electricity, sewers and the surfacing of main roads may be completed during this period. |

Figure 5.5. Schedule of Development of a Barriada in Three Selected Stages.

Source: John F.C. Turner (1972).

| Land Surface | Communications |
| --- | --- |
| Stage I at 1-2 years (Incipient) | |
| 20-30 foot x 60-80 foot plots allotted to each participant family on condition that it is permanently occupied by them.<br>Sites designated for anticipated community facilities; public squares serve as playfields, etc.<br>Streets 30-60 feet wide with rectangular grid varying between 150-250 feet x 250-300 feet. | Regular omnibus services are provided as soon as the land is occupied if, as is usual, the site is adjacent to an existing route; communal taxis (colectivos) often owned by residents provide additional service. |
| Stage II at 4-5 years (Developing) | |
| No Change | No Change |
| Stage III at 10-12 years (Consolidating or Consolidated) | |
| Some subdivision of plots in response to growing demand for rental accommodation and individual needs for capital and/or reduced space requirements as families shrink. | No change in transportation services (except for frequency with changing intensity of demand).<br>Telephones for public uses are generally installed at this stage and, if the area is large enough, a post office. |

Figure 5.6. Schedule of Barriada Development at the Three Selected Stages.
Source: John F.C. Turner (1972).

This urban pattern became a cultural code which exerts its influence on urban expansions like that of squatter settlements.

In Barriada Cuevas, the dimensioning of plots, blocks and streets are as follows: the plots vary in size from 6 to 10 metres front by 20 to 27 metres depth. The streets are from 10 to 20 metres wide in a regular grid-iron varying between 50-85 metres by 85-100 metres. These guidelines exert a certain influence on the agglomeration patterns at the household level. This is discussed later.

5.2.2 Household Level of Agglomeration

Patterns of agglomeration at the household level apparently develop at random. Room-dwelling and clusters spread over the settlement area apparently with no previously ordered land subdivision. The houses at Cerrada del Condor (south-west of Mexico City) are apparently scattered at random over the hillside though their distribution actually obeys underlying social structures, particularly kinship (Larissa A. Lomnitz 1977, p. 21, see Figure 5.7). Social structures are manifest in the built form at the household level in various ways. The formation of agglomeration patterns depends mainly on household composition and modes of appropriation (ownership or tenure system of land and physical structures).

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(cont)
Housing from around that period is still in use and design principles have clearly influenced Mexican architecture. Whilst the urban agglomerational principles have evolved, certain transformations in design principles have taken place due to socio-economic and cultural factors. See: Bataillon and D'Arc (1973) La Ciudad de Mexico. Sepsetentas, Mexico, Lars Lerup (1977) Building the Unfinished. Architecture and human action. Sage Publications, Jorge E. Hardoy (ed) Urbanization in Latin America: Approaches and Issues, Garden City, N.Y., Doubleday, 1975, p.17, Jorge E. Hardoy (July 1971) La Forma de las ciudades coloniales in Hispanoamerica. Buenos Aires: Centro de Estudios Urbanos y Regionales. Instituto Torcuato Di Tella.

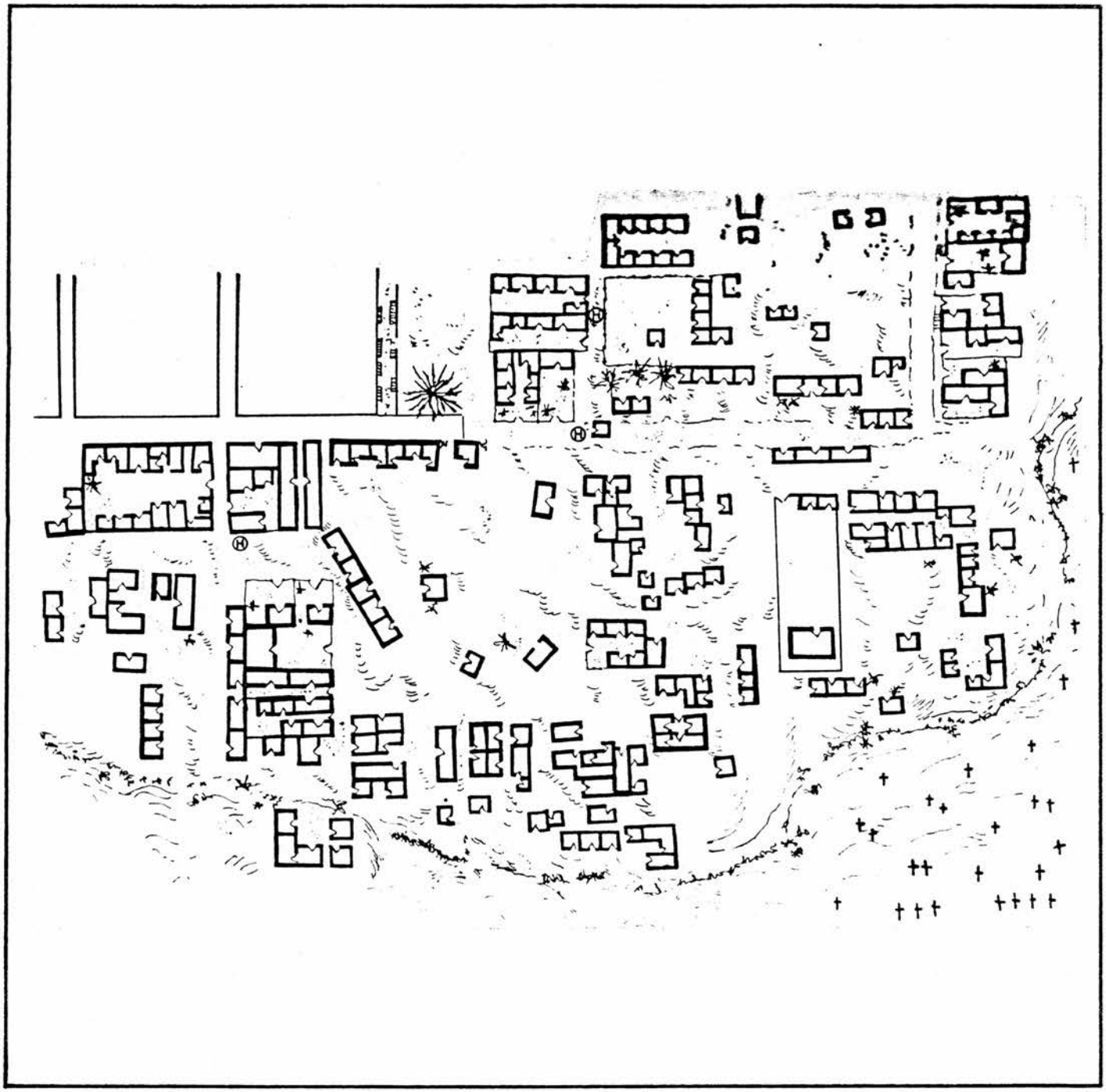

Figure 5.7. A map of the shantytown (Cerrada del Condor, Mexico City) showing the nearest urbanized street of Las Aguilas (upper left), and part of the cementery on the opposite slope of the ravine (lower right). Public water faucets are represented by H. "The houses are apparently scattered at random over the hillside though their distribution actually obeys underlying social structures, particularly kinship."

Source: Larissa A. Lomnitz (1977, pp. 23 and 21).

The dwellings generally consist of one or two rooms* most of these measuring 3.0 x 3.5 metres on average. Rooms are built one after the other and clustered into five general patterns. These patterns of agglomeration of dwelling cells will be described later (see Figure 5.8) followed by a description of the household formation. At this point is is necessary to distinguish two groups of clustered dwellings**: those clustered together in the form of vecindades, and those in the form of 'solares' or extended room-units. It is particularly important to make this distinction since they respond to different formations and are built for different purposes.

The vecindad, has the same constant characteristics: a double row of one-room apartments that face on a narrow lane. Access to this lane and hence to the rooms is through a gate controlled by the owner of the court; the families renting rooms are usually unrelated. Thus, the residential pattern is determined by the mode of appropriation of the building (one landlord and a large number of tenants) that tell us little or nothing about the social structure in the settlement. This particular aspect of the political and economic functions absolutely dictates the physical form of this type of housing.

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* In comparison with other squatter settlements; almost one-half of the households in Santo Domingo los Reyes (south of Mexico City) lived in a single-room dwelling that served all functions, and only one-fifth had more than two rooms. (See Peter Ward, 1976, p. 322).
There are distinct economic constraints which affect the life styles and in particular the extent of overcrowding conditions. The economic level is reflected in the number of people to a room, and in the number of people per bed in the household. Larissa A. Lomnitz (1976, pp.70-84) identified four economic levels among the settlers of Cerrada del Condor and made a correlation of economic level with income, occupation, property tenure and material belongings. In addition she pointed out that there appears to be a definite correlation between literacy and improvement in economic level within this settlement. Peter Ward (1976) identified Education as the second most important variable affecting upgrading conditions.

**These patterns of spatial arrangement exist also in other types of housing areas which respond to a different formation. For instance the inner-city low-income housing formation reveals the transformation of old buildings, originally occupied by middle and upper classes, into vecindades. The old buildings are subdivided and room units rented out.

Extended room-units are dwellings sharing the same plot and facing on a common yard. These may take various shapes; for example 'solares' which contain a larger central patio (yard).

Plots are shared or owned by the head of the household. Plots are also rented. Clusters of extended or joint family households spring up throughout the Cerrada del Condor settlement. Social processes and property relations have a certain degree of influence at the housing morphological level and transformation of household units. The sequence of the agglomeration of dwellings takes place in relation to household composition. Kinship relations are a major factor affecting the household composition.

The formation of a household in Cerrada del Condor has been described to be

> "... a dynamic process involving many random factors, such as the availability of vacancies or the availability of kin ready to move in when a vacancy develops." ...
>
> "The real-estate system of the shantytown operates according to the random occurrence of vacancies. Total strangers may be forced to live together in the intimacy of a vecindad and households may be broken up for lack of joint accommodation."
> (L.A. Lomnitz, 1977, p. 100).

These factors affecting the household formation are crystallized in several prototypes. Larissa A. Lomnitz (1977, p. 100) has made a unique classification of households based on the following principles:

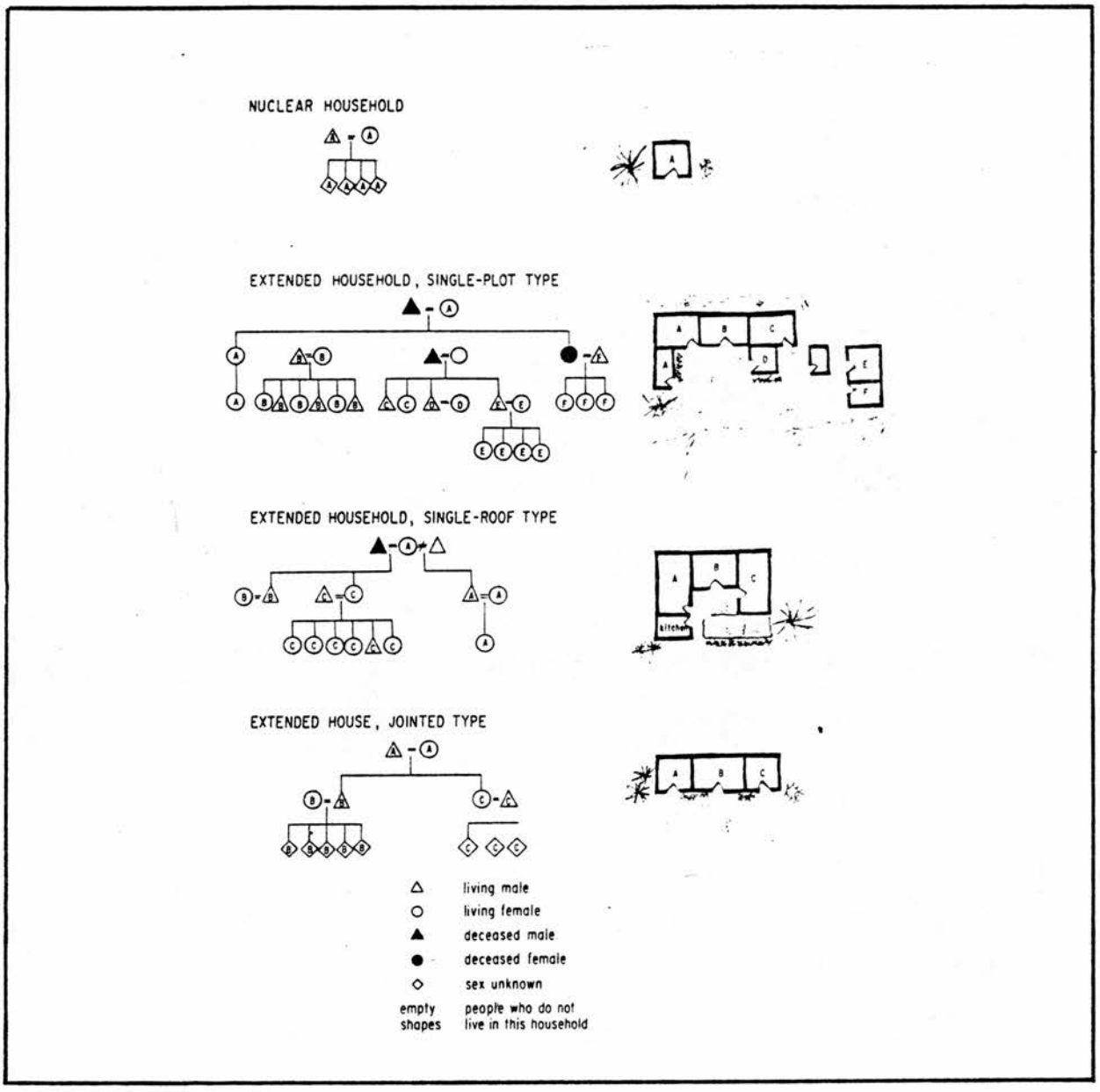


Figure 5.8 Residential-type classification of households in Cerrada del Condor. The letters represent the individuals inhabiting in the corresponding rooms. For the household types represented in the above figure it has been considered either kinship or both kinship and residence. It implies a domestic function with expense sharing, except in the jointed type.

Source: Larissa A. Lomnitz (1977, p. 101).

1. "According to KINSHIP, the household may be either nuclear or extended. A nuclear household contains a single nuclear family, and an extended household contains an extended family."

2. "According to RESIDENCE, the household may be one of three types: SINGLE ROOF, SINGLE PLOT, or JOINTED. A single roof household shares the same residential unit. In the single-plot type, a series of dwellings share the same plot of land; in the jointed type, the household occupies two or more adjoining residential units originally built for one household."

3. "According to DOMESTIC FUNCTION, households may be classified as (being) with or without expense sharing." (L. Lomnitz, 1977, p. 100).

This classification relates to Figure 5.8.

The patterns of these household formations are described below.

Households containing a single nuclear family are in the minority. Many of these families wait for a vacancy so that they might settle near relatives who had become established elsewhere in Cerrada del Condor. These groups belong to the poorest of all and generally do not own the plot but may own the one-room structure. In Cerrada del Condor and in any squatter settlement this type of household is generally short-lived and may be regarded as a transitional state before moving to or achieving the more stable arrangement of the extended type. As described before in Section 5.2.1, shacks tend to evolve or completely disappear due to external forces. A minority live in these conditions as nuclear families by themselves, without any relative in the settlement. Nevertheless they are incorporated in the neighbourhood networks. These networks develop in time and

take various forms; besides kinship exist compadrazgo*, cuatismo** and friendship. These are resources used by the marginals to survive the threat of poverty. These social economic structures are known among anthropologists as reciprocity networks. They have been conceptualized as a social field in which an intense flow of reciporocal exchange between neighbours occurs. The main purpose of a reciprocity network is to provide a minimum level of economic security to its members***.

The largest part of the social structure in Cerrada del Condor (a

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* COMPADRAZGO is a traditional institution of fictive kinship. The role of compadrazgo, under conditions of marginality, is a mechanism for strengthening social solidarity in the networks of reciprocal exchange. (L. Lomnitz, 1977, p. 159).

Compadrazgo is a relationship essentially between compadres rather than between godparents and godchild. (Forbes, J. 1971; Foster, G., 1965, pp. 10-11; and Kemper, R.Y., 1971, p. 165). For a description of several types and functions of compadrazgo see L. Lomnitz, 1977, pp.159-174.

** CUATISMO (from the nahuatl CUATL, "twin brother") is a native category describing a complex of norms, values, and social relationships built up around friendship in Mexican culture. (L. Lomnitz, 1977, pp. 175-180, includes a description of this type of informal social relation).

***The goods and services exchange within a reciprocity network are of various kinds. They may be information of any kind; job assistance; for example introduction to a trade or craft network; loans of money, tools and all kinds of articles for home and personal use; services, like the provision of accommodation to new migrants or temporary visitors, help with food and basic needs, assistance to relatives in need and mutual assistance in building and maintaining homes, and also in many minor services; moral support: that develop through social mechanisms or networks that generate solidarity and which are extended to all events in the life cycle. For further development of this subject see Larissa A. Lomnitz, 1977, pp.200-208.

shantytown in Mexico City) is represented in the JOINTED household (L. Lomnitz, 1977, p. 100). Here, there is no sharing of cooking duties or household expenses. Each family leads a separate economic life. On the other hand there is an intense reciprocal exchange including a wide variety of domestic functions*.

Nuclear families tend to share a common open area used as laundry, kitchen, and children's playground. Thus in a jointed-type the cooperation between close kin is promoted.

The majority of the population in Cerrada del Condor live in extended households of either single-roof or single-plot type. Within these households there are usually three generations: husband and wife, their descendants, and the latter's nuclear family of procreation. Among the single-roof type expenses are shared. Nevertheless there is a minority which does not follow this pattern of behaviour. Among the single-plot types, expense sharing is in the minority. These circumstances have a certain influence on the spatial arrangement. An example of the former type from Larissa Lomnitz's case study is as follows:

Three out of four familial groups share expenses, and this circumstance is manifested in the spatial arrangement shown in Figure 5.9. Three of the doors open on to central communal areas, but one is separate. The household living in this unit does not share expenses.

The pattern of household formation is extremely fluid. A household may adopt different arrangements without necessarily changing

*See case study descriptions. Larissa A. Lomnitz (1977), pp.103-116.

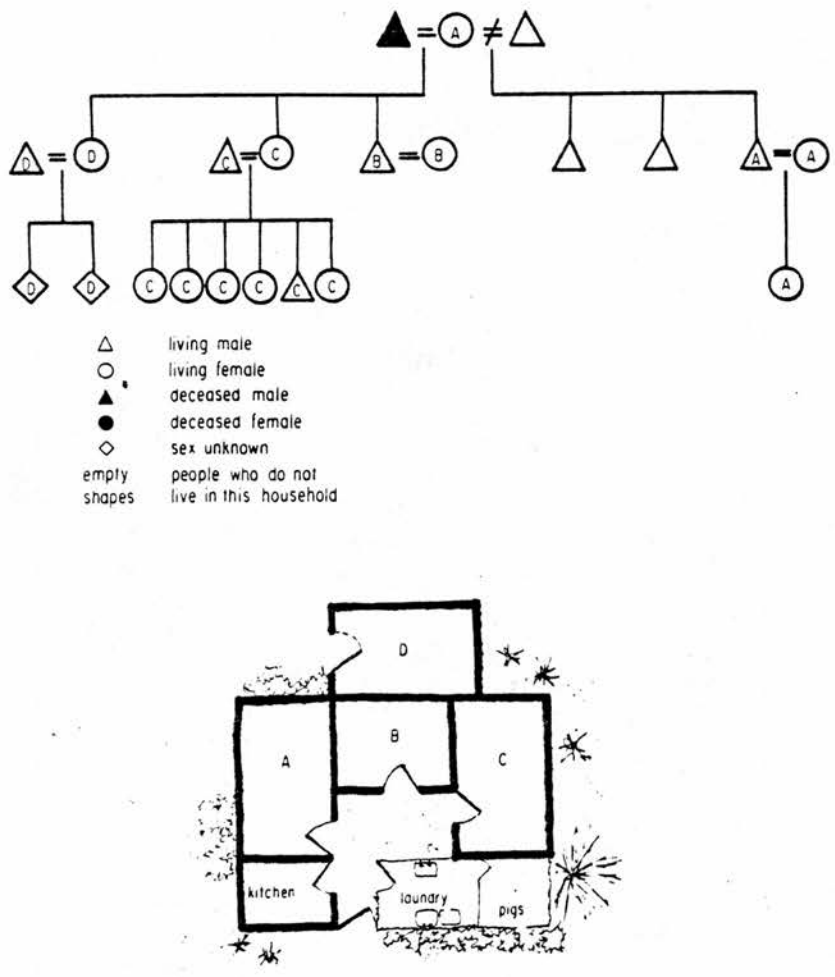



Figure 5.9. An extended family that lives under a single roof and shares expenses. Room D houses a nuclear family that does not participate in expense sharing.

Source: Larissa Lomnitz, 1977, p. 104

residence and often even the basic dwelling structure. New couples tend to integrate into a jointed-type household; eventually, however, they may do this after going through other stages such as the nuclear household. A nuclear household, by incorporating other nuclear families, becomes an extended household. This dynamic process of transformation in household types, without necessarily implying a change in residence and of basic dwelling structures, represents one of the most relevant features of marginal social structure.

Taking into account the previous description of household formation, we can classify the dwelling agglomeration patterns into 5 groups. (See Table 5.10).

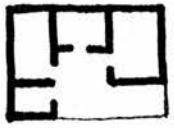
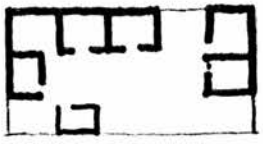
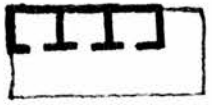
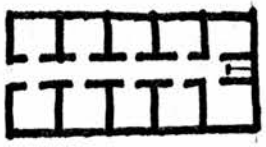
1. The SINGLE or TWIN CELLS. A single room dwelling unit. This is the basic element origin of any agglomeration. It is a household for a nuclear family.

2. ROOMS AROUND A 'CENTRAL' PATIO. The formation can be in L , U or □ shape. This corresponds to the extended household, single roof.

3. ROOMS FACING A COMMON AREA. Formation in L or U shape, i.e. solares. This corresponds to the extended single plot household.

4. ROOMS FACING A COMMON AREA. Formation in row and L shape. This is identified with the extended jointed household.

5. DOUBLE ROW OF ROOMS FACING A CENTRAL LANE. The formation is in general in ⊏ shape. This is a vecindad.

| Kinship & Extensions* | Household Type | Dwelling Structures General Characteristic Specifications | Agglomeration Patterns (Household Level) | Expenses Shared | Without Sharing Expenses |
|---|---|---|---|---|---|
| Nuclear Family | Nuclear Household | Two or one room(s) dwelling unit | (1) Single or twin cell i.e. shack  | ✔ | |
| Extended Family | Extended Household: (a) single roof | Sharing the same residential unit | (2) Rooms around a central patio formation in L or U shape or □  | ✔ | ✔ |
| | (b) single plot | A series of dwellings share the same plot of land | (3) Rooms facing a common area formation in L or U shape, i.e. solares.  | ✔ | ✔ |
| | (c) jointed | Two or more dwelling units for one household | (4) Rooms facing a common area formation in row and L shape  | | ✔ |
| Mixture of nuclear, extended and unrelated families | Single plot | A series of one room dwellings (rented) within the same plot | (5) Double row of rooms facing a central lane formation in ⊏ shape. Vecindad  | | ✔ |

*Includes temporary visitors and 'arrimados' (a kin or otherwise who comes for a short period and stays for years 'sharing' almost everything with the nuclear family).

Figure 5.10. Household types and agglomeration patterns.

The rooms are built one after the other extending the walls from previous rooms until the residential unit consolidates and acquires its 'final' shape. The formation of agglomerational patterns is guided to some extent by the boundaries of the plot, though in this case boundaries are not strictly marked as in the case of Barriada Cuevas (Peru), where surrounding walls are built first. The ordering of agglomeration patterns at the household and urban levels, which seem to develop at random in this type of settlement should be eventually incorporated into a settlement layout which follows neighbouring grid-iron urban patterns, hence it does fall under government controls.

## 5.3 THE CLIMATIC AND BEHAVIOURAL FUNCTIONS

The climatic and behavioural functions will be described in relation to examples from Lima and Mexico City. Climatic conditions in the two cities show certain differences which can be identified along the housing morphological transformations. They will be explained below.

The climate in Mexico City is variable throughout the year, but never reaches extremes. It has been identified as temperate /dry for both summer and winter (H. Caminos and R. Goethert, 1975, p. 71). Annual average temperature is 21°C. Rain lasts for a few months during the spring and summer. The dominant wind direction is north-west. Air temperature changes from 12° to 18°C throughout the year, and air relative humidity varies from 25% to 60%. This indication suggests that climate, in general, can often be relatively comfortable. Mornings can be cold and evenings cool. Midday in the summer can be quite hot and winter nights relatively cold.

(1)

## MEXICO

Ciudad de México/Tacubaya 19° 24′ N 99° 11′ W 2309 m

| Period 1931–65 Bibliography 14, 15, 16 | Temperature | | | | | | Relative humidity | | Precipitation | | | Bright sunshine | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Average daily | | Average monthly | | Absolute | | Average of observations at | | Average monthly fall | Maximum fall in 24 h | Average No. of days with 0·1 mm or more | Average monthly duration | Average per cent of possible | Maximum duration in one day | Average No. of days with no sun |
| | Max. | Min. | Max. | Min. | Max. | Min. | 0700 | 1400 | | | | | | | |
| | *degrees Celsius* | | | | | | *per cent* | | *millimetres* | | | *hours* | | *hours* | |
| January | 21·3 | 4·5 | 24·5 | 0·2 | 26·0 | −4·1 | 78 | 32 | 8 | 11 | 2 | 225 | — | 10·6 | — |
| February | 23·4 | 5·6 | 26·8 | 1·0 | 28·8 | −4·4 | 74 | 29 | 4 | 18 | 3 | 227 | — | 11·2 | — |
| March | 25·5 | 7·4 | 29·4 | 3·1 | 31·4 | −4·0 | 67 | 23 | 9 | 26 | 4 | 263 | — | 12·0 | — |
| April | 26·6 | 8·9 | 30·5 | 5·1 | 33·4 | −0·6 | 64 | 26 | 23 | 39 | 6 | 244 | — | 12·3 | — |
| May | 26·4 | 10·3 | 30·3 | 6·9 | 33·6 | 3·7 | 69 | 34 | 57 | 23 | 14 | 241 | — | 12·3 | — |
| June | 25·0 | 11·3 | 29·0 | 8·2 | 31·6 | 4·5 | 77 | 41 | 111 | 67 | 17 | 211 | — | 14·4 | — |
| July | 23·4 | 11·0 | 26·2 | 8·7 | 28·5 | 7·2 | 84 | 50 | 160 | 49 | 22 | 193 | — | 12·3 | — |
| August | 23·5 | 11·0 | 25·8 | 8·6 | 28·4 | 6·4 | 88 | 55 | 149 | 51 | 22 | 198 | — | 12·2 | — |
| September | 22·5 | 10·8 | 25·6 | 7·5 | 27·7 | 3·7 | 89 | 58 | 119 | 58 | 20 | 167 | — | 11·0 | — |
| October | 22·2 | 8·9 | 25·3 | 4·5 | 27·0 | 1·8 | 87 | 48 | 46 | 53 | 11 | 194 | — | 11·7 | — |
| November | 21·4 | 6·4 | 24·8 | 1·8 | 27·5 | −3·0 | 85 | 38 | 16 | 17 | 3 | 209 | — | 11·1 | — |
| December | 20·8 | 4·8 | 23·9 | 1·0 | 25·7 | −3·0 | 85 | 36 | 7 | 15 | 3 | 226 | — | 10·6 | — |
| Year | 23·5 | 8·4 | 31·0* | −1·6* | 33·6 | −4·4 | 79 | 39 | 709 | 67 | 127 | 2598 | — | 14·4 | — |
| No. of Years | 18 | 18 | 18 | 18 | 18 | 18 | 7 | 7 | 30 | 18 | 13 | 13 | — | 7 | — |

(2)

PERU PART II - 33

LIMA 12°05'S. 77°03'W. 394 ft.

| Period 1928-1943 Bibliography 52, 53 | Temperature | | | | | | Relative humidity | | Precipitation | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Average daily | | Average of highest each month | Average of lowest each month | Absolute | | Average of observations at | | Average monthly fall | Maximum fall in 24 hr. | Average No. of days with 0·04 in. or more |
| | Max. | Min. | | | Max. | Min. | 0700 | 1300 | | | |
| | *degrees Fahrenheit* | | | | | | *per cent.* | | *inches* | | |
| January | 82 | 66 | 87 | 62 | 89 | 59 | 93 | 69 | 0·1 | 0·1 | 0·5 |
| February | 83 | 67 | 88 | 63 | 92 | 59 | 92 | 66 | <0·1 | <0·1 | 0·1 |
| March | 83 | 66 | 87 | 63 | 91 | 61 | 92 | 64 | <0·1 | <0·1 | 0·1 |
| April | 80 | 63 | 84 | 60 | 93 | 56 | 93 | 66 | <0·1 | <0·1 | 0·2 |
| May | 74 | 60 | 80 | 56 | 84 | 52 | 95 | 76 | 0·2 | 0·1 | 0·8 |
| June | 68 | 58 | 75 | 54 | 81 | 49 | 95 | 80 | 0·2 | 0·1 | 1 |
| July | 67 | 57 | 73 | 52 | 81 | 49 | 94 | 77 | 0·3 | 0·1 | 1 |
| August | 66 | 56 | 72 | 54 | 81 | 50 | 95 | 78 | 0·3 | 0·1 | 2 |
| September | 68 | 57 | 73 | 54 | 78 | 51 | 94 | 76 | 0·3 | 0·1 | 1 |
| October | 71 | 58 | 76 | 56 | 79 | 53 | 94 | 72 | 0·1 | 0·1 | 0·2 |
| November | 74 | 60 | 78 | 56 | 85 | 51 | 93 | 71 | 0·1 | 0·1 | 0·2 |
| December | 78 | 62 | 82 | 59 | 87 | 56 | 93 | 70 | <0·1 | <0·1 | 0·1 |
| Year | 75 | 61 | 89* | 51** | 93 | 49 | 94 | 72 | 1·6 | 0·1 | 7 |
| No. of years | 15 | 15 | 15 | 15 | 15 | 15 | 5 | 5 | 15 | 7 | 10 |

Figure 5.10a. Temperature, Relative Humidity and Precipitation of the cities of Mexico and Lima, Peru.

$87^{\circ}F = 31^{\circ}C$ $73^{\circ}F = 23^{\circ}C$
$62^{\circ}F = 17^{\circ}C$ $52^{\circ}F = 11^{\circ}C$

Sources: 1) Meteorological office (1980, part I, p 83).
2) Ibid (1959, part II, p 33).

The climate of the city of Lima, Peru, is slightly hotter and more humid than Mexico City. It has been identified as hot/humid in the summer and temperate/humid in winter. Annual average temperature is 25°C. Relative humidity varies from 80% to 90%, and air temperature changes from 17°C to 25°C. (H. Caminos and R. Goethert, 1975). Therefore the climate in Lima is in general quite comfortable.

The shack and the permanent one-room dwelling unit are the basic spatial elements of shantytowns and squatter settlements. They function similarly; they 'work' multifunctionally. If a common open area is available, and the climate allows, common activity is held there throughout the day. Use of the interior is limited. The interior of the shack is dark, lit only through the doorway. The permanent dwelling unit built during the developing and consolidating stages often has windows, thus climate inside may have slight variations in relation to dwellings without them. If an open common space is available, the interior is used only for sleeping. Otherwise it is used for other activities, such as for cooking and eating if overcrowding conditions permit it. For instance Larissa Lomnitz (1977, p. 81) described that cooking is done in the bedroom as well as in the open, in front of the entrance to the room. For the first case she found that the average density is 5.4 people per dwelling, as against 6.2 if cooking is done outside. These activities take place outside not due to the preference for climatic comfort but due to the lack of appropriate covered space. Shacks and rooms in <u>vecindades</u> have the worst climatic conditions; in no instances do rooms have cross ventilation or proper light. They work

adequately as shelter against rain and wind, but deficiently against heat or cold. Thus they can hardly provide a reasonable level of comfort.

Apart from shacks and vecindades (which have the worst climatic conditions), families could enjoy better climatic conditions if over-crowding were relieved and proper materials and orientations were utilised. Yet none of these conditions is easily met. For instance, iron-sheets are generally used in Cerrada del Condor. They remain for many years at least during the incipient and developing stages. Roofs of this type increase the heat within the room, and give little insulation from cold at night (or winter in Mexico City).

Climatic conditions in the open spaces are often modified. In Lima where there is only little rainfall they consider it more appropriate to enclose the plot with a perimeter wall instead of building two or three rooms with permanent roofs. The perimeter wall provides privacy and improved micro-climatic conditions whereby the discomforts of the shacks are greatly reduced. The family can no longer be disturbed by neighbours' dogs and children. It is also a protection against pilfering. The wall gives the effect of having a spacious living area. It is more convenient to keep animals in the spaces created as well as artefacts and eventually plants and trees.

In Mexico, unlike their squatter counterparts on the periphery of Lima, there is not the same high priority for a high surrounding wall to provide respite from the harsh semi-desert conditions. Therefore viewed from the air there is less conformity than would be observed for the 'shoe-box' type of topography that emerges in Lima. The climate

*In these cases or when roofs are made of lámina de cartón, the absence of cross-ventilation worsens the climatic conditions.
**It improves the micro-climate in various ways; it provides shade during the afternoons, reduces the effects of dust storms around shacks and provides the use of alternative places with certain privacy.

in Mexico does not demand this protection. The delimitation of boundaries is made using barbed wire and poles. Eventually high walls are built, if needed, at the consolidated stage.

It is important to emphasise that climatic modification has no priority at the room level as it is not considered that rooms would provide more than basic shelter. These conditions emerge due to the overwhelming effects of the role of the political and economic functions, thus the climatic function is determined by them, and the behaviour of users must be adapted to the shelter's deficiencies.

## 5.4 THE ECONOMIC ARCHITECTURAL FUNCTION

### 5.4.1 The Economic Architectural Function: Incipient Stage

In this section we will deal with the housing production process corresponding to an incipient level or first stage of development of squatter settlements or shantytowns. We will refer to particular conditions of dwelling and building among specific low-income groups. Reference is made to the first stage of development of squatter settlements and to other similar conditions of dwellings found in '<u>ciudades perdidas</u>' (shantytown; literally, 'lost cities') or wherever there are rented shacks or shacks built over rented plots.

Peter Ward (1976) reported that squatters upon arrival purchase wooden poles and several sheets of '<u>lamina de carton</u>' (sheets of corrugated and waterproofed cardboard) with which they construct a single-roomed dwelling. This consists of a support frame with sheets of ('<u>lamina de carton</u>') nailed onto it. This is done usually by putting

the nails through bottle tops to increase the contact surface area to make it hold more securely. The roof is nailed on in a similar manner and further anchored by large blocks of stone. These are suspended by wires from the corners.

If sheets of 'lamina de carton' are not used, other materials would be acquired or scavenged: packing cases, beaten-out oil drums, etc. Elsewhere in Latin America, in Peru, squatters use wooden poles and straw mats to enclose the room (see Turner, 1972).

Kindred and friends organize expeditions to gather and transport waste materials, utensils, food for animals etc. from the neighbouring middle class areas. Materials collected are generally cans, oil drums, wood of any size, waste bricks from construction sites (where settlers may be temporarily employed), cartons and worn-out car tyres.

These light shacks are built by the head of the family helped by youngsters, friends and neighbours. The social reciprocity networks* foster mutual help in the community. These underlying social processes support aspects of the production of dwelling structures. Thus, taking this into account, building can be identified as a cooperative effort in which simple cooperation and individual labour predominates throughout all stages of dwelling transformations.

Building activities at this stage do not require much skill: with a little advice from leaders and neighbours a shack can easily be constructed which counteracts environmental elements like rain and wind. Only in the case of earthquakes they may collapse, but in this

*These social processes were explained earlier, in the section on the Political function.

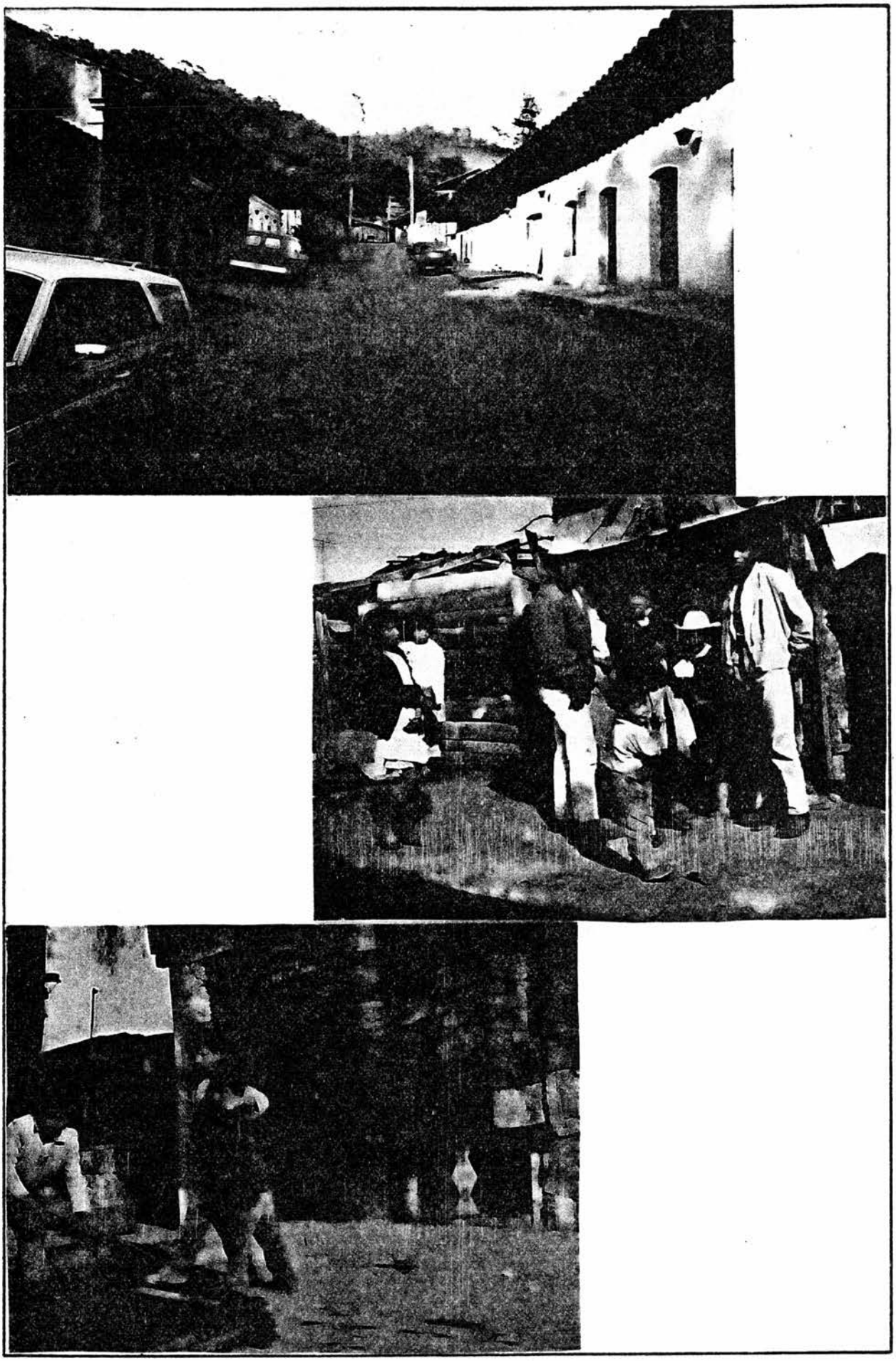


Figure 5.11. Photographs. Rural-urban housing transformation.
Shacks in urban areas do not obviously show images of village built form. Neither from villages like that above, which is traditional of Latin America, nor from ordinary huts. (Pahuatlán, Pue, México and a 'ciudad perdida', Mexico City.
Source: Author's photographs.

case they can be reconstructed (with all their deficiencies) with the same ease.

There is not a strict division of labour, yet mainly men undertake this task. Variations in the division of labour for any building operation occur according to (i) the household composition at this period of building or at the subsequent building stages leading to consolidation, (ii) the engagement of family members on (especially remunerated) working activities, and (iii) willingness of neighbours, friends and relatives to cooperate in building.

The boundaries of lots are clearly defined either by uncemented basalt walls, which are built gradually, or odd pieces of wood and wire. (P. Ward, 1976, p. 320). In Peru, at Barriada Cuevas the construction of high walls along the perimeter of the lot functions also climatically (see Climatic function, previous section).

The land used for building is either illegally occupied at early stages or is subdivided for letting to latecomers to the settlement. These two different relationships of settlers upon the land condition quite distinctly the forms of dwelling structural transformation and living conditions in general. (The relation between tenure and structural transformations will be discussed later).

The settler who is an owner-occupier at the incipient stage has the possibility of becoming the legal owner of the plot. This is the primary condition for housing consolidation.

Shack tenants are those generally at the bottom of the class structure

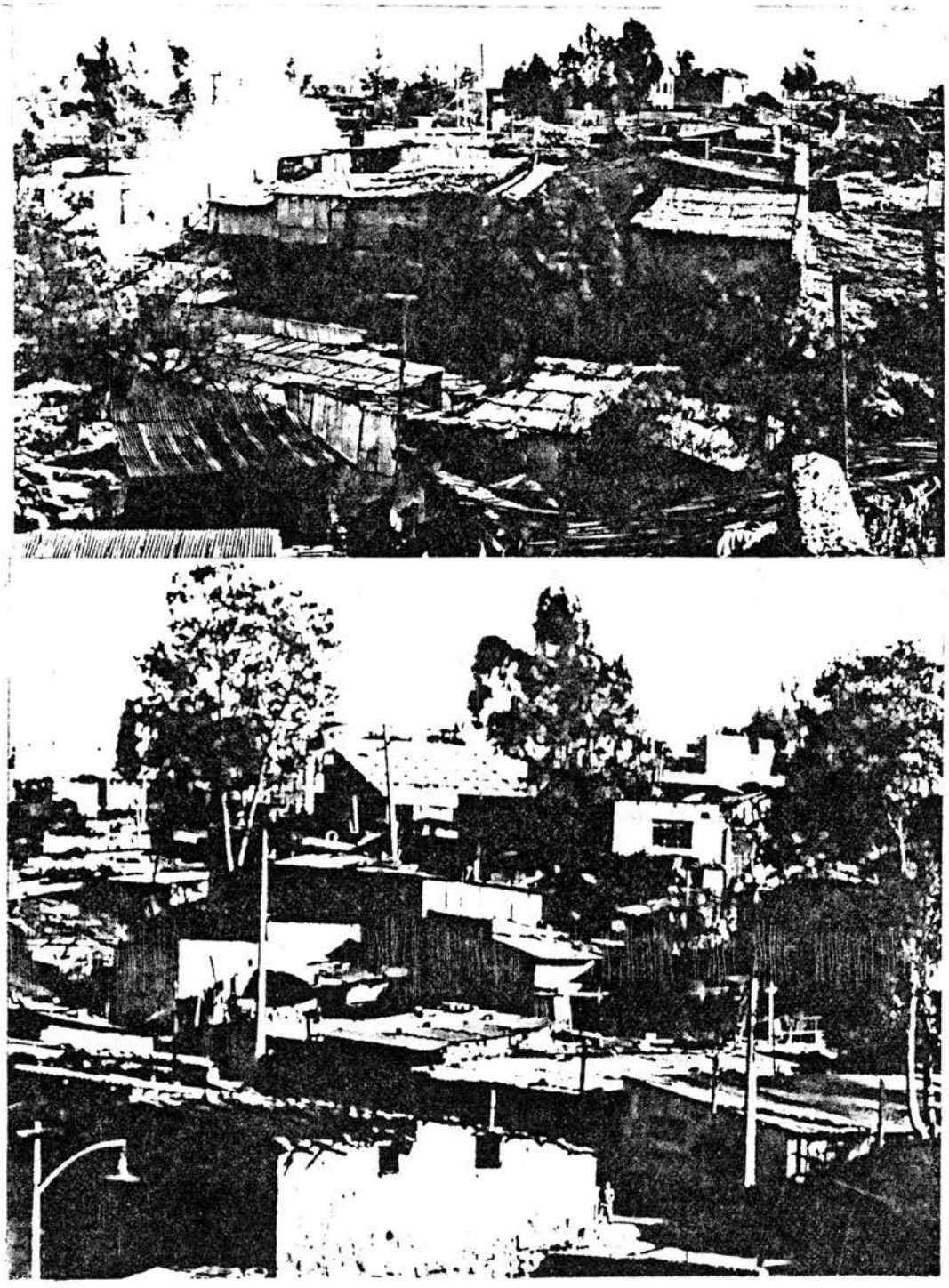


Figure 5.12. Photographs. Colonias Proletarias; Mexico City.

1. 'Part of Colonia Nueva. A dust storm swirls through the adjacent street at the left. The stone wall at the right was built by the former landowner to impede squatting on his property. Most of the dwellings are still makeshift structures of lamina de carton, but even so numerous television aerials have sprouted.' Some sections of Colonia Nueva show 'the highly irregular volcanic terrain occupied by the settlement. The natural vegetation around the houses creates a semirural appearance.' This also shows why shantytown children are at a loss to decide whether they live 'in the country' or 'in the city'. (L. Lomnitz,1977, p.28).
2. Part of Colonia Periférico. This settlement occupies hilly ground. The street pattern is totally irregular. Mexico City.

Source: Wayne A. Cornelius (1975, p. 40).

and most likely to remain in marginal conditions. These groups are incorporated into a variety of renting modes and have to face the constraints of rent fluctuations. Rents fluctuate according to building quality and space available, but also other factors contribute: for instance the personal relationship between tenant and landlord.

Larissa Lomnitz (1977) p. 80, refers to this when describing conditions occurring in 'Cerrada del Condor' shantytown*.

> "The principal landowner of the shantytown frequently grants special rent privileges to relatives, compadres, former workers in the brick kilns, or to some settlers who need a break".

Few settlers do not pay rent, only for instance 'cuidadores' (caretakers who look after the plot for a period of time) and those exempted from the payment of rent for various other reasons, such as relatives or compadres of a property owner. (See Larissa Lomnitz, 1977, p. 78).

In Cerrada del Condor, Larissa Lomnitz (1977, p. 27) reported that dwellings were unpainted structures made mostly of bricks or adobe. They have little mortar and no outside finish, in such a way that the owner could easily take them apart and re-use the bricks elsewhere. Only nails, mortar, cement floor, and other expendable materials are wasted. Other possibilities were open: the owner may decide to sell his dwelling to the next occupant for a sum that both agree. At this stage market prices are less likely to determine the dwelling's costs. Yet in every circumstance the labour power gives a new value to the

*Most of the property (land) in Cerrada del Condor originally belonged to just one owner. There has been neither squatting nor collective occupation of land. Only 7.9% of households own their properties. See Larissa Lomnitz, 1977, p. 78.

materials used, whether they are waste and recycled ones or commercial products. Use-value is turned into exchange-value. These groups of dwellers build their shelter provisionally with the aim of becoming owners and with the hope that they may one day improve their general conditions of living.

### 5.4.2 The Economic Architectural Function. Developing and Consolidated Stages.

Once settled on the appointed piece of ground, squatter families build throughout a long period of years on the plots more or less regularly laid out by the barriada organization and they have a relative security of land tenure.

The transition between 'incipient' and 'developing' stages is dependent upon increased security of tenure, either through explicit recognition or implicit acknowledgement that the authorities do not intend to eradicate the settlement. The 'developing' level is characterized, as a consequence, by building better physical structures leading towards permanency and completion at the 'consolidated' stage.

It is recognised that solid foundations and well-built walls foster the conditions for claiming land tenure, thus avoiding the threat of eradication.

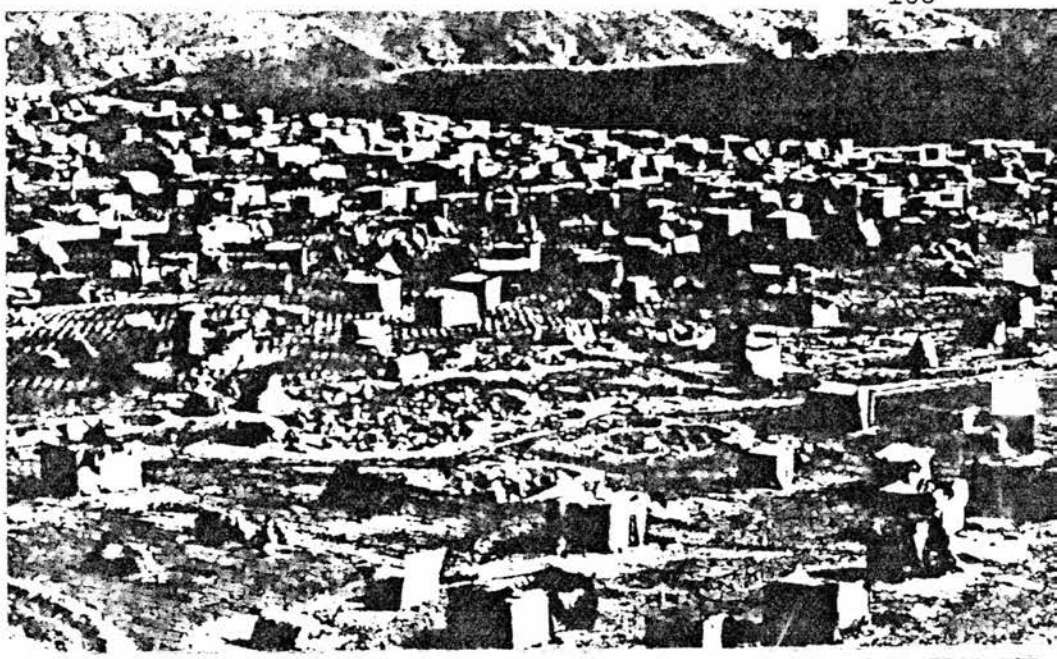
In terms of construction the process follows, though at a slower pace, a similar trajectory in the production of parts to that of any other ordinary building process. Yet it involves rudimentary

| Structures | Components of dwelling structure |
|---|---|
| Stage I at 1-2 years (Incipient) | |
| Initially all structures are provisional but starts on permanent dwelling structures are made at the earliest possible moment in order to consolidate claims and invest savings before purchasing power diminishes. | The 'choza' a primitive and temporary shack made from woven cane mats supported on bamboo poles<br>- average family - 5 members<br>- begin to build foundations |
| Stage II at 4-5 years (Developing) | |
| During the first years the shell of a first floor is generally completed enclosing an average of 1,100 square feet of roofed space; permanent school structures are building during the first years. | The 'cerco', the enclosing wall surrounding the possessor's lot and within which the household will continue to live in (chozas, casucha) while the most of part I of the permanent house is being built (walls, structures, floors, and roofs)<br>- increase average members of family<br>- increase duplex unit. |
| Stage III at 10-12 years (Completing) | |
| After about 10 years the ground floor one-family unit is completed and a (potentially independent) second floor is started; commercial and public buildings will be completed or newly built to modern standards. | Most of the ground floor usually completed often with provisional roof. Permanent roof structure: hollow clay tile reinforced concrete joinery and metal work doors, windows and window grilles installations: water supply, domestic drainage, electric light fittings, finishes: floor finishes, plastering and painting. Second storey; repeat of the relevant components.<br>- family begin to live here<br>- duplex unit doubled. |

Figure 5.13. Schedule of Barriada Development
Source: J.F.C. Turner (1972 and 1971, p. 82).

Stage I at 1-2 years (Incipient) few hours after the invasion.

Pampa de Comas Lima



Stage II at 4-5 years (Developing)

Cuevas in March 1964 after 2½ years

Stage III at 10-12 years (Completing)

St Martin de Porres after 8 years without technical or financial assistance. Houses at various stages of development. Shacks still existing.

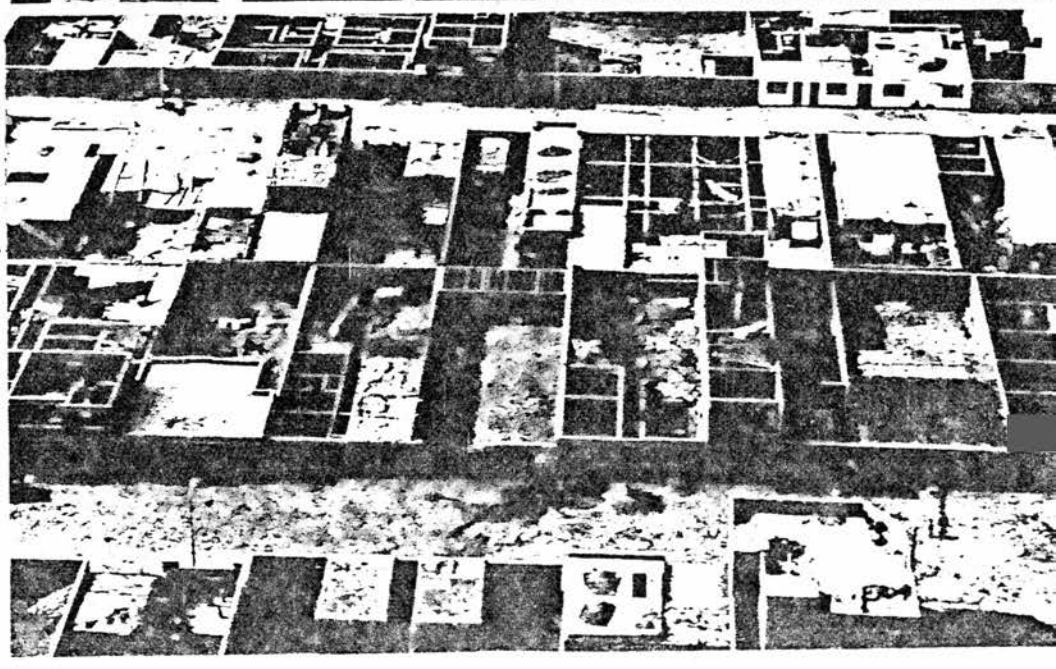


Figure 5.14 Photographs. Barriada development at three selected stages.
Sources: (1) William Mangin (1973, p. 237), and (2) & (3) J.F.C. Turner (1971, p. 76).

technology, often traditional techniques, and in general large quantities of labour. Building site activities grouped in construction sequence:

1. Building a shack (incipient level).
2. Preparation of the site; levelling and marking the ground.
3. Excavation and building of foundations.
4. Building of walls; peripheral or one- or two-rooms.
5. Roofing; lámina de cartón or concrete.
6. Installations and finishings.
7. Extension of rooms; next to previous ones, and then second floors.

Gradually, permanent structures start being constructed. Once a portion of the plot has been levelled, foundations made of cement and basalt blocks are constructed to provide a consolidated floor upon which one or several rooms can be built. The foundations and brick walls follow a process of transformation into a more solid form over time. During approximately the first five years this permanent construction is initiated, and walls, in the most advanced sites, are completed. These reach roof heights.

Peter Ward (1976, p. 321) reported that in Santo Domingo los Reyes, a squatter settlement in Mexico City, walls were made of rough bricks (tabique), though only a small proportion of settlers had gone so far as to plaster and paint the walls internally. This step would allow investment in window and door frames which, along with unplastered walls, could be removed in the event of eradication.

Few settlers finish the first floor structures and a limited number build, step by step, a second floor structure. Roofs for the 1st

floor can be either 'lámina de cartón' (asbestos sheets) or corrugated metal roofing, but also in few cases concrete is used, this being essential for consolidating the second floor. Thus eventually, at a consolidated level, most of the housing acquires this type of roof material. Initially few dwellers lay a concrete roof, partly because it is a permanent feature, but also because it is the single most expensive item in house construction. It involves the hire of wooden scaffolding, boards onto which the concrete is laid and a large workforce of peones (unskilled workers) or friends to mix and carry the materials. Everything is done by hand.

In most of the production processes at the developing and consolidated levels, family and friends make up the production team, yet in some stages, as mentioned above, labour may be hired or exchanged, and often small teams of builders are contracted. But the 'owner' builder remains his own contractor.

The construction of the house involves a considerable labour input, which can take several forms. Rod Burgess (1978/1979) identified three forms the labour input can take:

> "... it can be the investment of additional labour time (the prolongation of the working day); it can be labour put into construction during periods of unemployment; or, it can be the paid or unpaid labour of others." (R. Burgess, 1978/1979, p. 1109).

Self-building and consumption are tied to and influenced by market forces. For instance, at the developing and consolidating stages of the housing production process, products and raw materials found in the market are used, such as cement, roofing materials, iron parts,

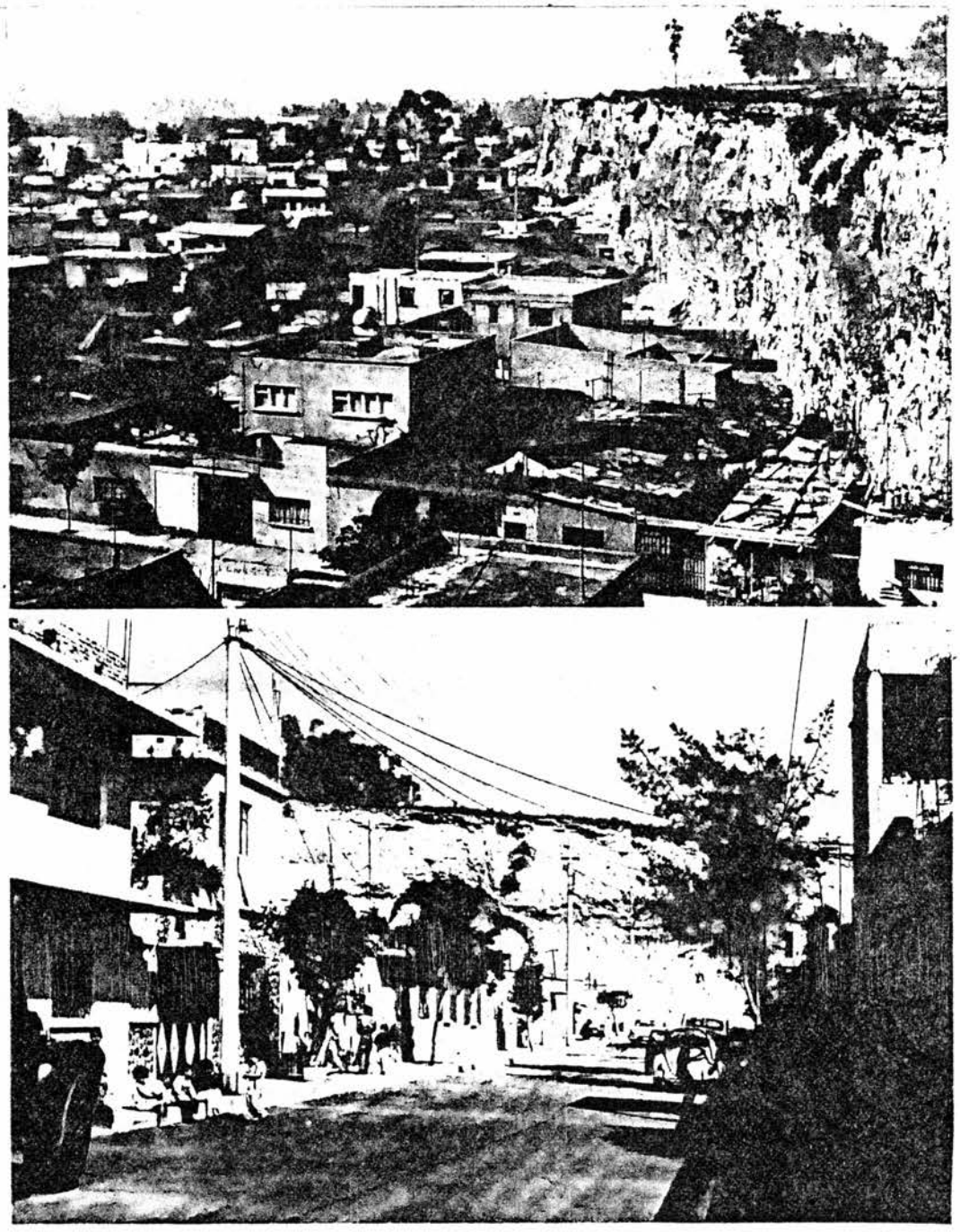


Figure 5.15 Photographs. Colonia Militar, Mexico City. (1) The cliff on the right marks the edge of the sandpit that formerly occupied the site. The numerous solidly built houses, many of two storeys, contrast with the temporary shacks that predominate in recently formed squatter settlements. This settlement reached full consolidation. (2) A residential street in Colonia Militar.

Source: Wayne A. Cornelius (1975, p. 42).

electrical and sanitary equipment. These products already have an exchange-value that is derived from the labour time spent on their fabrication. Self-built houses are primarily produced for self-consumption, not for exchange. Nevertheless this status of the product as a potential commodity can be modified by bringing the house as a commodity onto the market for rental or for sale. (See R. Burgess, 1978/1979, p. 1115). Thus use-and exchange-value are created in the process.

These building undertakings mark a definite change in attitudes and expectations of the squatters; they mean firm steps towards consolidation. Legalization of the land occupied is expected and then the channelling of resources into housing is most likely to occur, from both the Government and especially the residents themselves.

## 5.5 SUMMARY AND CONCLUSION

This chapter has described typical examples of popular architectural processes. In order to draw general conclusions about these processes, we have attempted to analyse the structure of four main architectural functions. These functions are relationships between 'elements' which modify the housing environment and are manifested in the building object or else in the building processes which mediate their connectivity. Although the characteristics of the architectural functions have been described (as a process), their most significant aspects are listed below in order to draw further conclusions.

1. The Economic Function which interacts with the behavioural and political functions. These functions integrate the popular housing mode of production. The most important input for this process to take place is land. Its availability must be free or at least at a low cost to the families in need of it. These housing processes take place on land located in the periphery and/or on land of difficult access within the city.

Housing production, its products and transformations were described within a three stage framework: the incipient, developing and consolidating levels. The transformations of the building processes and products (transitional or final) within and between these levels are quite distinct. The incipient level is characterized by the building of shacks. These light structures are made of waste materials collected by the family from surrounding middle class areas, construction sites or from rubbish deposits. The dwelling structure is often made of brick or adobe using little mortar, or else any available waste material is used. The fragile construction allows their builders to take everything apart and use it elsewhere.

The developing and consolidating stages are characterized first of all by the following conditions: settlers acquire an explicit recognition or implicit acknowledgement from the authorities that they do not intend to eradicate the settlement. Thereafter better physical structures leading towards permanency are built at the developing stage. These structures are transformed gradually until they are consolidated. Materials used are more consistent: mainly brick for walls and iron-sheets or lámina de cartón for roofs. Eventually roofs of concrete are built in order to consolidate the house or else to add

second floors. Throughout the production process, the family forms the building team, although occasionally labour is hired and small teams of builders may be contracted. Reciprocity networks on building activities are essential and information, goods, tools and materials are exchanged. Building operations are carried out by individual labour or in simple cooperation. To reach a reasonable level of house development may take many years. Total consolidation occurs after generations: popular housing production takes place far behind family growth.

2. Climatic and Behavioural Functions: Shacks and one-roomed dwellings 'work' adequately as shelter against rain and wind but deficiently against heat or cold. They can hardly achieve a reasonable level of comfort. Iron sheets are commonly used as roofs of Cerrada del Condor's housing during the incipient and developing stages. Roofs of this type increase the heat within the room and provide poor insulation from cold. The behaviour of dwellers must adjust itself to conditions of deficient climatic modification by their shelter.

3. The Political and Behavioural Architectural Functions: Two levels of spatial organization are affected by the political and behavioural architectural functions; at the urban agglomeration and the household (i.e. room-dwelling and cluster) levels.

At the urban agglomeration level, dwellings develop upon defined plots. The rectangular plots are generally arranged following a rectangular grid-iron pattern. This urban agglomeration pattern consists of streets laid out in a grid-iron pattern around a central square. Such

urban form has developed throughout history and as a cultural code exerts its influence to urban expansions such as that of squatter settlements. Land subdivision into plots is done by leaders of the occupation as those from Barriada Cuevas (Lima) or by landlords as in the case of Cerrada del Condor (Mexico). Government plans may eventually make slight modifications to the settlement layout.

At the household level of agglomeration (clusters of single-room dwellings) and also at the urban level, especially in settlements such as Cerrada del Condor (Mexico City), the organization of space which apparently has no order in its development, obeys underlying social structures, particularly kinship. At the household level the agglomeration pattern's formation depends mainly on household composition and modes of appropriation. Dwellings are generally composed of one or two rooms. A single room dwelling serves all functions. These measure 3.0 x 3.5 metres on average. Patterns of household formation have been identified with various groups in relation to kinship, residence and economic functioning. This has been taken into account in order to identify five patterns of dwelling agglomeration:

i. The dwelling cells. A unit of one or two rooms is the basic element of any type of clustering. These can be shacks or permanent brick-structures; land and structures can be either rented or possessed. The household is generally composed of a nuclear family. It develops during the incipient stage.

ii. Rooms around a 'central' patio. The formation can be in L, U or square O shape. It corresponds to the extended household

formation, single roof type. Structures are generally permanent if development takes place during the 'developing and consolidating' stage. Thus land is likely to be owned by the original or oldest head of the household. Living expenses are generally shared.

iii. Similar conditions exist for the rooms facing a common area in which case the clustering formation is also L or U shape. A typical example is the so-called 'solares'. It corresponds to the extended single plot household formation. In this case the plot is owned by the original household but shared and rented to relatives or compadres. Living expenses are not necessarily shared.

iv. Rooms facing a common area. Formation in rows or L shape. This corresponds to the extended jointed household. Each family leads a separate economic life. But as in the other cases there is an intense reciprocal exchange in domestic functions.

v. Vecindades formations are generally in ⊏ shape. Double rows of rooms face a central corridor. Dwellings are of one room and often with an extended 'cocinita' (little kitchen). Each dwelling is rented, hence built for that purpose. The owner may live in the front rooms, thus controlling access. Families renting rooms are usually unrelated. Thus modes of appropriation are conditioning this residential pattern formation, mainly the private property of this large purposely built subdivided building.

The first general conditions to be met for self-regulated settlements to function in favour of low-income groups is the availability of plots

in the city's periphery. These should be free, or at least low cost. Settlers occupy the land that may have to be paid back to the authorities. For this to be possible, it is necessary that the land must not be usable for activities that would increase the value of capital. That is through its occupation and exploitation. This means that the land has either the worst environmental conditions, or has no public services, or has bad accessibility or other obstacles to speculation.

The state legalizes an invasion by granting tenure. This encourages squatters to build, but also and primarily facilitates the penetration of market relations in land, where originally they did not exist or where they were 'underdeveloped', precisely because they were illegal. (See R. Burgess, 1978/1979, p. 1120). It is generally recognized that squatters hardly benefit from such legalization of land, unless the state intervenes in the land market mechanism in these suburban areas. So, in order to benefit the poor, the state must intervene in the process of regulating market prices in peripheral land. (Ibid).

By the time the settlers build the first shack, they have already had several years of urban experience. Nevertheless the shacks remain as shacks, however far they are apart. At incipient stages squatter houses do not reflect images of village houses (see Figure 5.11) or of adjacent middle class city areas. Yet, at the developing and consolidated stages housing looks more like houses which had similar origins; that is, housing built upon illegally, subdivided and exchanged land (squatters and non-squatters) and which physical structures have been progressively developing (see Figure 5.15)*, these have

*We could argue that in some cases certain elements (structural or spatial) of the progressively developed housing may have been influenced by housing designed by professionals, though this is not a generality. The poor in general compose the construction industry's labour force, so through them the influence in building form is manifest.

both modern urban and traditional features.

Once the settlers have lived in the shacks for some time and land tenure is secured, a progressive housing development begins. Security of tenure is promoted by initiating permanent structures. Rooms are built one after the other.

Production is generally slow. Rates of construction depend greatly on, as R. Burgess (1977, p. 57) asserted:

i. the amount of disposable income and savings;
ii. the ability to cut down on the subsistence needs, mainly food and fuel;
iii. the possibility to prolong the working day, but also on
iv. the availability of other peoples' labour, and on
v. the availability of materials either in the market at accessible prices, or elsewhere.

Building products and raw materials found in the market (such as iron parts, bricks, cement, electrical and sanitary equipment, glass, structural components, etc) are produced by large national or international monopolies. Thus they control the prices and the supply of them. The squatters and marginal groups in general, to a certain extent, reduce the penetration of industrial capital. They avoid monopolies either by 'collecting' or making their own building materials or by buying them from small distributors or producers.

All the above conditions partly determine the quality and organisation of space which results in various patterns of spatial distribution of dwellings. Few patterns of dwelling agglomerations exist (lineal,

L , U , square O and long ⊏ development). The resultant room clusterings respond to household formation. Each family has a room for multipurpose use. Often there are small enclosures made of cheap or temporary materials. This enclosure is built against an exterior wall of the dwellings and is used for cooking. Otherwise cooking is done in the bedroom or also in the open in front of the entrance to the room. In spite of dwellings extending, after household extensions occur, each nuclear family remains living in one or twin roomed dwelling units. Household composition is very dynamic and changes occur without changing residence, or modifying the physical structures. Similarly, living conditions remain stagnant in purpose-built vecindades. Here the dwelling agglomeration pattern is static, it does not manifest kinship relations. Private property directly affects this type of dwelling agglomeration.

Nuclear families build their room next to the dwellings of their kin if expenses are likely to be shared or good relations exist. To that extent kinship orders space at the level of the extended-nuclear household but kinship structuring is not manifested in the physical structure at individual levels. Housing does not grow at the pace of the family. Over-crowded conditions are not easy to overcome, nor are the shelter's deficiencies. The transitional and end products resulting in the developing and consolidated stages could appear as completed and adequate buildings, in spite of constraints developed from a rigid design. However the end product can be a deficient and deteriorating type of housing which would restrict the development of a human and healthy urban life. All the architectural functions are determined by the settlers' subsistence economy and manifested in the mode of housing production and

buildings morphology. Nevertheless, the economy of the marginal groups has proved to be efficient in two respects:

1. in the utilization of social resources (through reciprocity networks) for economic ends; and
2. the recycling of surplus and waste materials towards their maximum utilization.

   (See L. Lomnitz, 1977, p. 213).

This efficiency obeys the constraints posed by the physical structure upon the settlers' behaviour. Paradoxically and reciprocally, the settlers' behaviour strengthens their relationships in order to, collectively and individually, respond to the demands of their needs and the priorities determined by their marginal conditions.

So far, the transformations occurring within the production process and its effects on the spatial distribution and built form of various popular housing processes have been studied. Their relevant issues together with those of the'Primitive' (Chapter 3) and 'Government' (Chapter 6) housing processes will be the subject of analysis of Chapters 7 and 8. For such a purpose the essential features of the popular architectural process have been tabulated below. We should begin to question whether or not the internal or external factors affecting the production, spatial distribution and transformations within and between these housing processes have the same or similar origin and what common grounds exist, at their various [SCAPEB] architectural functions.

It is obvious that in general these popular housing processes are not

completely satisfactory. Their architectural functions are often degraded or deranged, therefore affecting the process of production and its product. The result is bad quality of dwellings and generally inhabitable. Also there is a limited supply of housing for an increasing number of poor dwellers living in overcrowded conditions. Therefore there is a need to induce changes in order to modify the popular housing processes and overall conditions of living. An alternative mode of housing production and support systems to improve the quality of life and environment is suggested in Chapter 9.

These popular housing processes develop within the lower circuit of the economy. Their interaction with the upper circuit (and its capitalist housing mode of production) is observed in the process of speculation of land; acquisition of it by the Government and private developers or real estate agents. Also to a limited extent, industrial capital is interpenetrated as well as the financial one in some regions and up to certain levels of secured income. The Government and in general the actors behind the various interests of capital have been attempting to incorporate these settlements into the upper circuit, through the various housing and settlement programmes; e.g. urban renewal, relocation of '<u>ciudades perdidas</u>', <u>autoconstruccion</u> (self-built), new housing schemes, legalization of land etc. Housing processes with this orientation are the theme of the following chapter (6).

5.7 The following tables refer to the Popular Housing Process:

| ELEMENTS | DESCRIPTION |
|---|---|
| SPACE | a) Interior spaces are simple and uniform; cubics.<br>b) Exterior spaces are undefined at initial stages and simple and enclosed at secondary stages. |
| STRUCTURES,<br>AND<br>MATERIALS, | a) Square single or twin rooms are the basic dwelling unit.<br>b) Rooms size are 3.0 x 3.5 m. predominantly.<br>c) Incipient level;<br>Light structures (shacks) predominate.<br>Waste materials are recycled; i.e. wood pieces, tins, car tyres, etc. Often brick and adobe are used with little mortar then are re-used when rebuilding elsewhere.<br>d) Developing and Consolidating levels;<br>Mainly brick and concrete are used as well as iron sheets and 'láminas de cartón' for roofing. |
| GROUPINGS, | e) Household level;<br>Building units (rooms) arrangement develop into five patterns of dwelling agglomeration, identifyable into:<br>i) Provisional shacks or brick structures permanent in principle.<br>ii) Grouping arrangement: Lineal, L,U, square O and long C (vecindades).<br>f) Urban Level;<br>Rectangular plots agglomerations follows a streets-blocks grid-iron pattern around a central square. |

Fig.5.16 Table; Spatial Elements and Configuration.

This and the following tables refer to the Popular Housing Process. Examples have been taken from Mexico and other Latin American countries. These tables represent a synthesis of the description and analysis of this housing process.

| ELEMENTS | DESCRIPTION |
|---|---|
| | The performance of this function is determined by conditions of socio-economic marginality. Other functions are subordinated to the economic one. |
| OPERATIONAL FACTORS; | |
| Technical knowledge, | It is simple. Skills might be there or learned by necessity. |
| Object of labour, | a) Initially it takes the form of waste materials in a simple patchwork-like arrangement, made into shacks. At secondary stages it takes the form of pre-made building materials simply transform into brick walls and iron/carton sheets or concrete on roofs.<br>b) Land is located in the periphery and/or in areas of difficult access within the city. It has no public services and is difficult to speculate upon. |
| Means of labour, | These are hands as 'instruments' of labour as well as simple tools equally employed. |
| Sets of operations | Building operations are simple, carried out individually or in simple co-operation and within the site. |
| WORK ORGANIZATION; | |
| Organising principle, | Reciprocity networks and kinship relations are essential. |
| Production unit, | The family rarely integrate the work-team. But the household head acts as worker and/or his own contractor. Occasionally labour is hired; so small teams of builders are contracted. |
| Division of labour, | Generally by sex and age with non-strictly division of tasks. |
| Form of Co-operation | i) Restricted simple co-operation,<br>ii) Individual labour. |
| Property relations and authority. | Incipient level;<br>Land is possessed by occupiers. Shacks are generally owned by occupiers. Authority is vested on household head and/or in leaders.<br>Developing and Consolidating Levels<br>Land tenure is secured and owned by the head of the household. Vecindades are a product of one Landlord owning large sites. No collective ownership exist, yet tools and materials may be exchanged through the reciprocity system. Production is both use and exchange value oriented. |

Fig.5.17 Table; The Economic Function of Architecture. (Interacting with Political and Behavioural Functions of Architecture)

| ELEMENTS | DESCRIPTION |
|---|---|
| POLITICAL AND BEHAVIOURAL FUNCTIONS, (interacting with the Economic function) | These functions interact at two levels of the spatial arrangement;<br>i) At the urban agglomeration level a cultural code is manifest as rectangular plots arranged within grid-iron urban patterns. This is ordered by participation of settlers and their leaders or organized by Landlords or public authorities.<br>ii) At the room-dwelling level and clusters. Agglomeration patterns formation depends mainly on household composition and private ownership; these social structures exert their influence upon five patterns of spatial formation and building processes; shacks, cells and progressive clustering development (lineal, L,C, and O) and vecindades long (C). Purpose built vecindades owned by one Landlord negates kinship manifestation. Decisions are taken by dwellers (owner/occupier) and/or by Landlords.<br>Settlers political organization appear at various instances of the settlement formation; namely at the land invasion process and the first encountering with authorities and also along of the land legalization periods. Co-optation is exerted upon leaders. There is a political/legal subordination.<br>The correspondence between both functions is subjected to cultural/economic constraints. |
| CLIMATIC AND BEHAVIOURAL FUNCTIONS. | The correspondence between these two functions is deranged.<br>As shelter, dwelling structures function defficiently, the dwellers' behaviour response to internal climate is resigned to come to terms to, such conditions. Climatic and Behavioural functions interact through meeting defficiencies. |
| SYMBOLIC FUNCTION, (interacting with Political and Behavioural Functions) | (This Function is implicit in the descriptions)<br>This function is repressed, it is not consciously manifest. For instance structures are neither urban nor rural expressions; Kinship in not clearly manifest in spatial arrangement, it is even negated in purpose built vecindades.<br>An initial stages of the housing process, this is expression of survival, later of submisive and defficient urban integration. People's religiosity is not manifest in housing space or built form. Cultural and economic marginality is self-spoken. |

Fig.5.18 Tables; Political, Climatic, Symbolic and Behavioural Architectural Functions.

# CHAPTER 6

# THE GOVERNMENT HOUSING PROCESS

## 6.1 INTRODUCTION

In this chapter the Government Housing Process is described and analyzed mainly as far as it involves the housing provision for low-income groups. Reference is especially made to new developments of housing schemes. The housing processes described take place in Mexico City.

State housing is an expression of the spatial activities of groups that occupy a territory in economic and political subordination to a dominant state complex. These groups are characterized by their engagement in the productive or non-productive activities (e.g. bureaucracy) of the system. The character of the built form is given by the ideological function inherent in politicians and professionals representing the interest of the ruling class by whom production is controlled.

Thus, what we are calling "Government housing processes" develop in the higher circuits of the economy and they have the characteristics of this economic sub-system. General features of it have been described before (Chapter 4). Government housing processes are undertaken by professionals and building workers engaged in housing institutions or private enterprises. There are a number of housing institutions in Mexico. (Their initials are BNOSPSA; FOVI; DDF-DGHP; INDECO; INFONAVIT; FOVISSSTE. These are the most important institutions at the present time, promoting and financing housing programmes)*.

*Housing institutions in Mexico are: Banco Nacional de Obras y Servicios.

Several programmes are running within each institution of which two are the most important*; these are the programmes of financing and production of new housing which take 70% to 90% of the resources of each institution. These programmes develop in various forms:

a) Internal or External Promotions housing programmes. The latter develop mainly in INFONAVIT and FOVISSTE. These are explained below.

b) Direct action or technical advice to private enterprises as it takes place in FOVI.

c) Programmes addressed to different socio-economic groups: housing of social interest and housing of popular interest as organized in INDECO and DGHP (DDF) housing institutions. (These are explained below).

The occupational composition of the sector to which new housing is addressed includes bureaucrats, workers in industry and small enterprises,

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Publicos, S.A. (BNOSPSA); Programa Financiero de Vivienda (PFV); Fondo de Operacion y Descuento Bancario de la Vivienda (FOVI); Departamento del Distrito Federal (DDF); Direccion General de la Habitacion Popular (DGHP); Instituto Nacional para el Desarrollo de la Comunidad y de la Vivienda (INDECO); Instituto del Fondo Nacional de la Vivienda para los Trabajadores (INFONAVIT); Fondo de Vivienda para los trabajadores del Estado (FOVISSSTE) and Instituto Mexicano del Seguro Social (IMSS). A well informed review of the action of these institutions is found in Gustavo Garza and Martha Schteingart (1978). La Accion Habitacional del Estado en Mexico. El Colegio de Mexico. See also Tomasz Sudra (1976) Low-income Housing Systems in Mexico City. PhD. Thesis. MIT. and COPEVI (1977), Vol. II, III and IV.

* Other programmes exist, for instance individual credits and housing improvement; site and services and self-help housing. Some housing programmes are being planned and implemented, as outlined in the National Housing Plan (Programa Nacional de Vivienda 1979/1980); Programme to Support Self-help Housing; Housing Cooperative; Housing for Renting; Rural Housing; Emergency Housing; Programme of Housing Norms (Regulations/ Design Briefs); Programme of Standardization of Components; Programme of Systemizing Prototypes; Programmes of Management and Maintenance of Housing Schemes and the Land Programme.
See Desarrollo Urbano, Programa Nacional de Vivienda (1979/1980) pp. 155-262.

peasants, workers of public services and professionals. They belong to the lower and middle classes.

The description which follows is organized within a matrix of five architectural functions. These are the symbolic, the climatic, the political, the economic and the behavioural ones. In some of the functions an attempt has been made to organize the description taking into account the programmes identified as internal and external promotions and the housing of social and popular interest. The concept 'popular housing' is related in general to housing for low-income groups in urban or rural areas. Housing of 'social interest' is related to a sector of the society that, even having low income, can pay housing instalments in a more or less long term. (G. Garza and M. Schteingart, p.56.)

In the description of built form reference is made mainly to three housing schemes built in Mexico City: 1) The Unidad Independencia finished in 1960 built by IMSS; 2) The Ermita-Zaragoza, 1974-75 built by DDF-DGHP; and 3) The Alianza Popular Revolucionaria, 1976, built by FOVISSSTE. (See tables. Fig.6.5)

## 6.2 THE POLITICAL AND BEHAVIOURAL ARCHITECTURAL FUNCTIONS (Interacting with the symbolic and economic ones).

The political function of the Government housing process is related to the controlling 'agents' that, directly or indirectly, influence built form, dwelling space and/or the building process. That is to say the political function is identified here with Regulations and cultural architectural codes; both of which are expressed through (Government) spatial controls and manifested at various levels of the spatial arrangement.

Financing systems, management, planning and production processes affect mainly two levels of spatial organisation: the urban and the dwelling levels. Yet the political architectural function takes effect in the following three levels:

1) At the level of organization of the process in its various dimensions; a) within the internal structure of institutions and production units and b) around the rationalization of operations. Due to the nature of the housing process e.g. scale of schemes and investments, number of participants etc., in addition to external factors and their trends such as technological changes and specialization, etc., the housing process must be rationalized. Thus the structure of decisions and control directly effects the production process and the product.

2) At the urban agglomeration level, dwellings, single houses and blocks of flats develop within urban schemes totally designed by professionals at the service of private firms or public institutions.

3) At the dwelling level and clusters. These are also fully designed by professionals and thus controlled by several 'agents', e.g. building regulations.

These three levels will be described below. The political architectural function determines the whole housing process therefore emphasising its influence in the production process (see the economic function) and the various levels of design: urban, clusters and dwelling arrangement. The description of the behavioural function is implicit, but is specially emphasized at the scale of the dwelling spatial distribution.

### 6.2.1 Organization of the Government Housing Processes

These housing processes, viewed from their political architectural function, are organized in terms of roles played by different participants at various stages. The participants are the user, client or Government institutions, professionals and contractors.*

The internal structures of institutions and construction firms play a definite role in the organization of production. This also qualifies the housing product. The internal structure of the housing institutions

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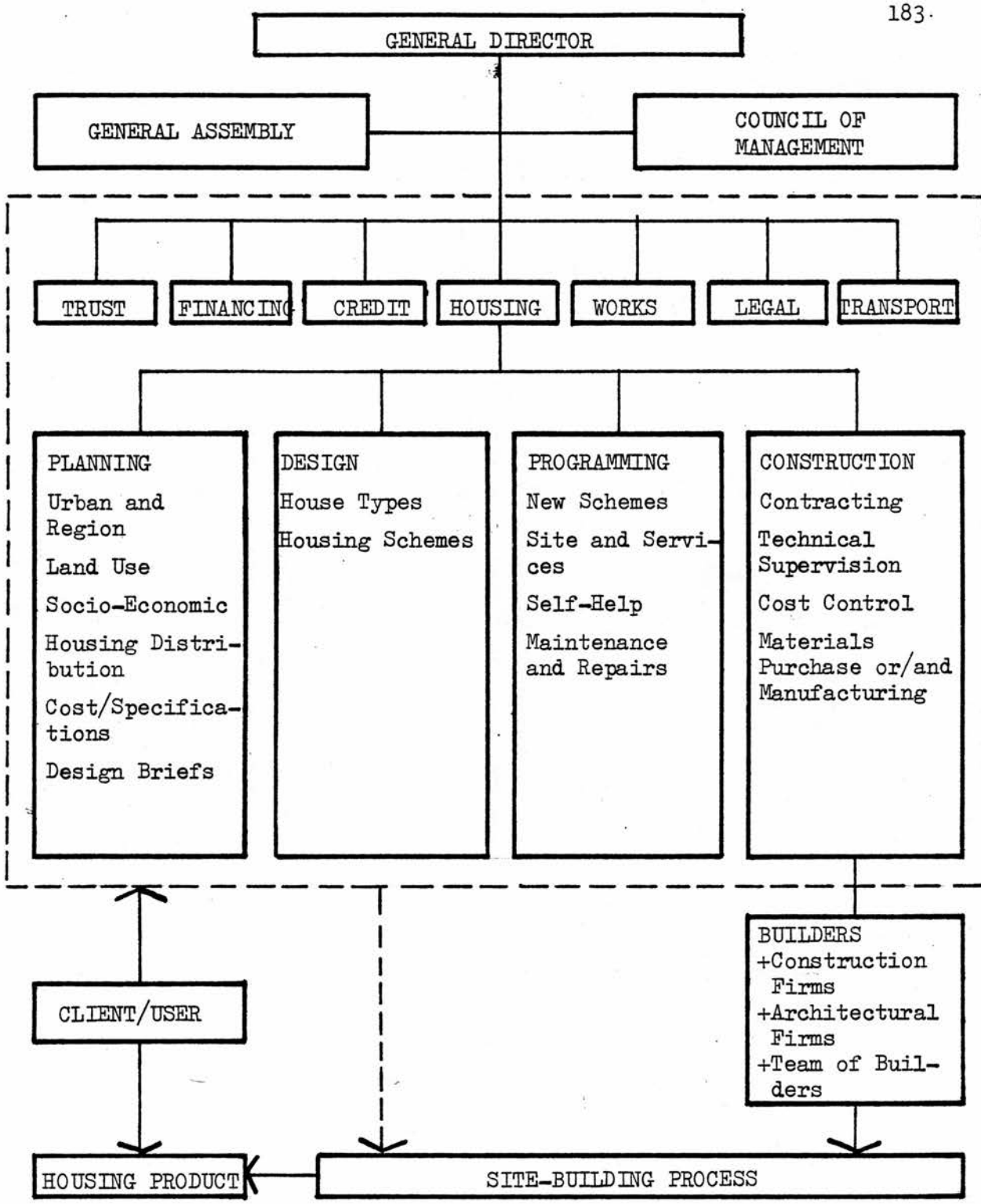
*Building workers and manufacturers also participate but are generally excluded from major decision making processes that would influence built form. Except in the use of industrialised building systems where manufacturers have a more define influence upon housing and architectural processes. This is not a generalized practice in a Developing Country but is more common in a industrialised one. See D.A. Turin (1968) Building as a Process. NEPO (1978) How flexible is construction. and P. Guedes (1979) The Macmillan Encyclopedia of Architecture and Technological Change.

is hierarchically organized and highly centralized. On top of the organization politicians and businessman dictate their views in relation to financing, production, distribution and exchange. Some of these tasks are shared by architects and planners who define the use of space, though acting in a lower level of decision making.

Looking at the figure (6.1) which shows the internal structure of mexican housing institutions in relation to housing production, the top level is composed of a general director, a general assembly of stockholders and a council of management. They are mainly high Government officials, and as the case of BNOSPSA (National Bank of Public Services and Works) stockholders and representatives of private banks. The internal structure of INFONAVIT and FOVISSSTE is composed of representatives of workers, entrepreneurs and Federal Government. The rest of the institutions' top of administration is composed of high public officials. After the top level of management BNOSPSA organization includes seven departments; trust, financing, credit, housing, works, legal and transport. The intermediate level is recruited from the departments of Planning, Programming, Design and Construction. In the case of external promotions the task undertaken at the planning, design, programming and construction are shared or completely carried out (depending on the type of programme) by construction and architectural firms.

In general terms the top level deals with financial matters, the middle one with planning and control of production and the lower level with production itself. The upper levels of the hierarchic structure of




Planning, design, programming and construction becomes large departments, expecially if there are internal promotions. In the case of external promotions the task undertaken at the design, programming and construction departments are carried out by construction or architectural firms. The top level organization is characteristic of BNOSPSA. In the case of INFONAVIT and FOVISSSTE top level administration is composed of representatives of workers, entrepreneurs and Federal Government. Otherwise housing institutions are attached to larger organisms i.e. DDF-DGHP and IMSS. In these cases the structure is obviously different. See G. Garza and M. Schteinghart (1978).

Fig. 6.1 The Internal Structure of Mexican Housing Institutions, in relation to Housing Production.

decisions control production through specified information systems (e.g. plans, regulations, programmes etc.)

Government housing programmes are tied to private and state capital interest in two levels; at the level of financing (with public and private capital) and at the level of production (with the construction industry where commercial and industrial capital dominates).

Programmes of financing and construction of new housing take 70% to 90% of the resources in each institution. Large housing schemes have better financial viability and thus take a larger proportion of this capital. The result of more production is the high standardization of the product. Larger profits are gained by large construction firms and returns of investments are secured; future users must be well off besides having fixed jobs. Private and public financial mechanisms and sources are applied to housing processes identified with middle and upper classes. This conditions stimulate the relations between the Government and the private sector.*

Except for the Housing Funds, 85% of the resources of the institutions come from private banking, and 15% from the Federal Government. Some

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* The links between the State and the private sector is increasing. The construction industry played an important role in the development of the economy since the sixties and increased considerable during the last decade. The State stimulate the development of the industry and reciprocally the entrepreneurs participate in the planning of programmes for investment. This influence was obvious when representatives of the construction industry help to conceive and plan INFONAVIT in 1972.

resources of FOVI come from International Banking Systems. Otherwise financial resources of Housing Funds are drawn from workers wages which amounts to 5% of them and are brought forward or paid by the employers.

With the capital accumulated in the housing institutions the public sector undertook, between 1970-74, 18.6% of the total production (17.1% by the private sector and 64.3% by the popular one), at the production level several fractions of capital operate; in the first place the urban land rent is determined by the level of investment of new buildings and its location in the urban mosaic as well as by the real estate market operating around it. Thereabout the cost of land in relation to total cost of house unit production varies from 8% to 35.2% (DDF) in the public sector (COPEVI 1977 Vol. IV. p. E87). The cost of materials account for an average of 40% in relation to the total cost of housing. Thus in large scale production manufacturers of materials benefit with increasing profits especially where the production of basic materials tend to be monopolised ( e.g. cement, iron and roofing materials) and, therefore controlling the market prices.

The cost of housing through external promotions tends to be 13%[1] more than the cost of housing internally developed. All these facts indicate that the housing product is a result of both the centralization or hierarchic structure of decisions, and of the intervention of various fractions of private and public capital.*

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* For a description of the various fractions of capital in the production of housing in Mexico see COPEVI (1977) Vol. IV. Investigacion Sobre Vivienda. EL CAPITAL EN LA PRODUCCION DE VIVIENDA.

1 This is due to the profits made by private firms, in 1975. See G.Garza and M. Schteingart (1978 p.168).

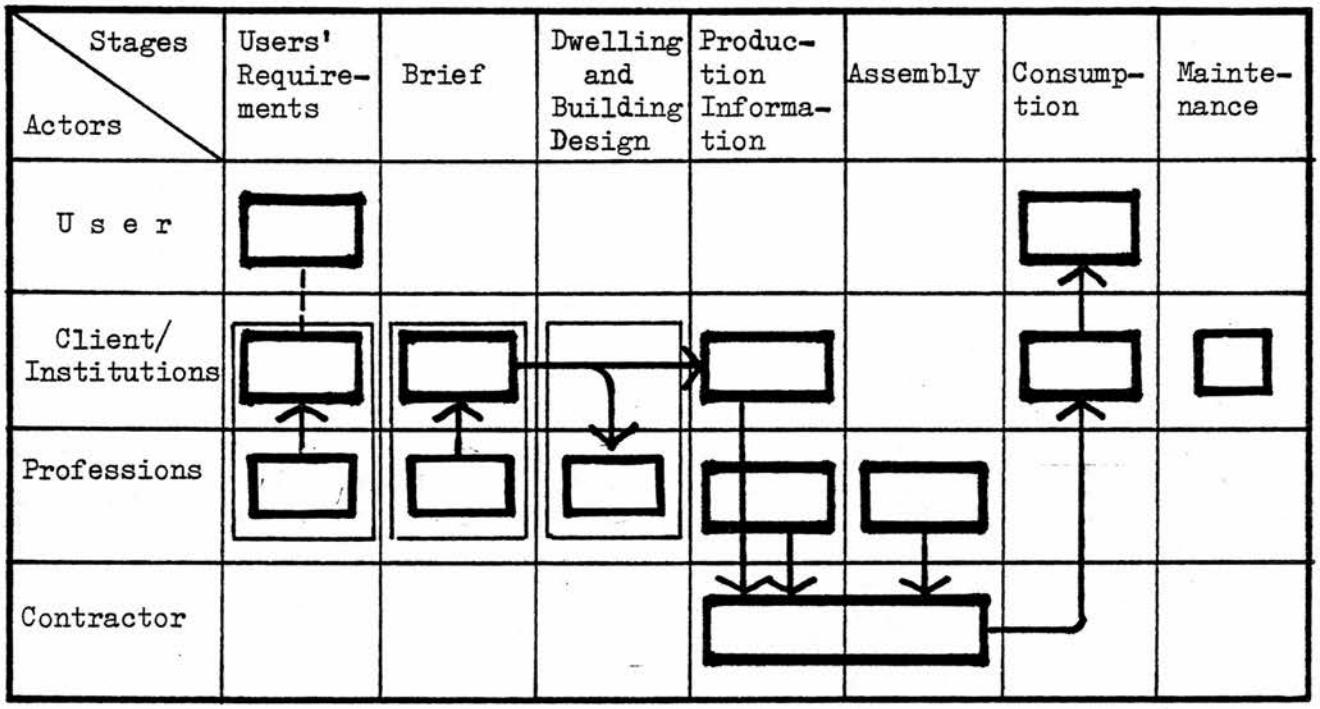
Subsequent to the large centralized organizations with their large scale of production and the intervention of the various capitalist interests, comes the necessary rationalisation of the operations involved in the housing process.

The housing process may take two distinct forms since large, medium and small schemes are produced by the Government either internally or externally. Internally produced housing (internal promotions) is totally controlled by Government institutions. Externally promoted housing is mainly undertaken by private enterprises, but certain controls are exerted through regulations.

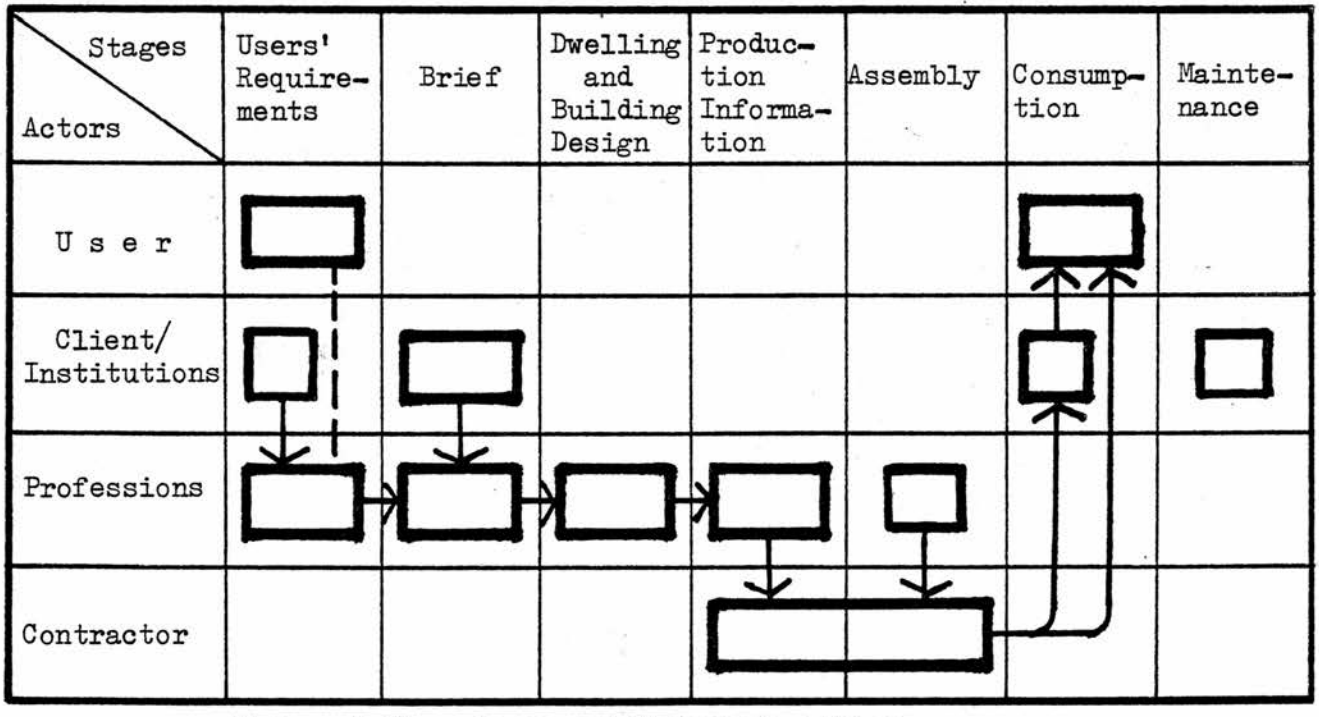
The following figure shows the participants and the stages of the two housing sub-processes. It indicates flows of information, direction of decisions and sequence of actions by participants. The stages identified are: (1) estimation of housing needs and users' requirements; (2) brief-making; (3) urban and building design and assembly; (4) production information and assembly; (5) consumption; and (6) maintenance. (See Figure 6.2).

Thus the political architectural function at the level of the organization of the process unfolds as follows (differences between both subprocesses - internally or externally promoted - are identified:

Stage 1. Estimation of housing needs and users' requirements.
In the internally produced housing, internal promotions, the following occurs: because the user is not known individually until the later stages of the process, professionals within the institutions have a dominant role, first of all in estimating total and local housing




Internal Promotions




External Promotions and Technical Advice

Fig. 6.2 Internal and External Promotions, Actors-Stages Flow-Chart

needs. These are correlated with income groups and the ability they have to pay for housing. In addition institutions and professionals interpret and quantify users' requirements.

In housing produced outside the institutions (external promotions), the interpretation and quantification of users' requirements is shared by architects within private firms whilst following regulations. Often the design briefs are dictated by the institutions. An essential feature of these briefs is the assessment of users' priorities of demand for housing and urban services, made by professionals.

Stage 2. Design Briefs: In both internal and external promotions, the responsibility for establishing a brief is in the hands of the professionals. Approval of this is done by chief planners and architects. Subjective user requirements are converted into sets of objective instructions for design action. These sets of instructions are organized according to potential user groups and possible compatible housing types. (See below). In order to integrate a strategy of planning for a specific housing scheme, design briefs must meet the regulations in terms of number of rooms per dwelling type; minimum space and common space within buildings (corridors and stairs); urban services, land use, densities, open space; general criteria for grouping and distance between buildings etc. These regulations mean to control design and construction and are issued by the Government housing institutions as well as by the DDF*.(Mexico City).

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*See Gustavo Garza and Martha Schteingart (1978) and Reglamento de Construcciones del DDF. This operates only in the Federal District, and the housing institutions mean to cover the whole country.

Stage 3. Urban and building design. The preliminary design function is the responsibility of professional designers whether they are in public or private enterprises, though designs are subject to approval by chief planners or architects. (The description of both levels of design is done below).

Stage 4. Production information and assembly. Professionals dominate the production information stage. At this point, however, the contractor is brought in different capacities depending on the particular method of inviting tenders or awarding the contract. Estimates, drawings and specifications are prepared for general contractors and sub-contractors.

Contractors and their builders teams undertake the construction of the housing scheme under supervision of professionals. By this time the infraestructure of the site should be well advanced,if not yet finished. The infraestructure is undertaken in some cases by the institution, as in the case of the DDF.

Some specific variations exist in both housing sub-processes in relation to contracting. For instance INFONAVIT arranges that planning and design should be undertaken by private firms which should follow their design, legal and financial policies. Thereafter construction is undertaken by a group of contractors. Contracts are given to large constructions firms especially in the metropolitan area of Mexico City. Otherwise, in the countryside, a committee should give preference to local enterprises. In the externally promoted housing process, INFONAVIT have a minimum participation, thus private firms control the process

and exert their influence in the market.*

In the case of FOVISSSTE architectural design is done through contracting a large number of architects' offices. Then the process of assembling is carried out by contracting builders, and professionals to supervise construction. (G. Garza and M. Schteingart (1978) pp. 196-197). The production process is described later under the economic function.

Stage 5. Consumption. In both cases in internally and externally produced housing, the user (as client) is brought in late in the process: this happens after production is completed. Since users' requirements are based on assumptions and this is done at initial stages, the users have to adapt to their externally pre-conceived needs. Users' participation is limited to possibly choosing the location of the dwelling in the housing scheme and the size of it which is determined by their income.

Stage 6. Maintenance. Management and maintenance of Government housing schemes are undertaken by building societies, that is throughout the period of repayment of the credit. Among the functions of the building societies are to deliver to users their dwellings in good condition; to arrange all legal transactions; to clean communal spaces and to provide a good system of vigilance; to maintain the equipment and instal-

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* See Gustavo Garza and Martha Schteingart (1978) pp. 165-67. La accion habitacional del Estado en Mexico. Private firms in addition tend to build for middle class groups. Their control on the process is reflected in the cost of housing which tends to rise 13% higher than housing produced internally. Side effects are noticeable in the speculation of land and rising cost of materials.

ations. (G. Garza and M. Schteingart (1978) p. 94). Consequently the participation of dwellers in looking after and modifying their dwellings is discouraged and limited*.

The political architectural function of the level of organization and decision making processes exert its influence upon the other architectural functions. It is not just the hierarchic and largely centralized structure of decisions that determines and characterizes this housing process but also the other aspects of the same architectural function; namely regulations of different kinds and architectural codes which are reflected in building form through the various processes of planning, management and production. In addition, it is important to emphasize that the articulation of the interest of the various fractions of capital in the production, consumption and exchange play a determining role in defining the quality of the process and the product. The State represents and fosters the optimization of capital value for the various fractions of capital (e.g. industrial, finance, land and property capital) involved. The interest of the various fractions of capital are satisfied through a particular set of operations that characterizes them. Rod Burgess (1978-79 pp. 1127/28) gave a brief description of how that occurs:

> "For the fraction of finance capital they allow the maximum extension of credit facilities and participation in formal capital markets: there is a wide-

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* For an evaluation of the performance of a Government housing scheme see the study done by Pilar Lepe and Martha Arreguin(1980)

spread need for credit both in terms of production (advances of Capital to State and construction interest) and consumption (initial) downpayments, amortization and interest repayments). The interest of urban landed capital are satisfied in the large scale supply of lands to the State housing agencies and large property companies, usually at inflated prices. Property capital has a vested interest in maintaining such programmes because they can participate directly in State housing schemes and can dovetail them with their own plans for industrial, commercial and residential development. The interest of industrial capital are satisfied through the way in which the design and planning specifications of government housing projects rationalize the interest of an industrialized building sector (e.g. construction and assembly of prefabricated components and structures, use of industrialized and standardized materials etc.)."

### 6.2.2 Urban Level of Agglomeration

Agglomeration at the urban level responds to geographic constraints, flows of people, goods and traffic, as well as to planning regulations concerning open spaces, densities, land use, layout and specially building types and the way these are grouped at architectural levels (see below). These imply to use particular design principles or architectural concepts.

The spatial configuration of housing is arranged by means of grouping and mixing buildings and open spaces of various types. Two types of housing are built in Government housing schemes in Mexico. These are low and high rise buildings; low rise are one family and two family (duplex) houses. High rise are blocks of flats from four up to nine floors. (See plan and data of Unidad Independencia, Figures 6.4 - 6.5).

The housing configuration seems to unfold following two distinct patterns of spatial distribution. On the one hand it responds especially to modern trends in planning and architecture. On the other it has some aspects of evolved traditional urban patterns. Ideas from both architectural modes are found in single projects, in spite of their apparent incompatibility. A noticeable feature is the overlapping of concepts which have opposed origins, and therefore, are in contradiction, but which it nevertheless has been attempted to integrate into one scheme. For instance, looking at the Unidad Independencia Housing Scheme (1960) we can trace CIAM principles of urban design which were based on particular aesthetic principles (which Le Corbusier applied in his large scale projects of St Die and Chandigarh). CIAM (1933) advocated rigid functional zoning with green belts between the areas reserved to the different functions and a single type of urban housing; that of apartment blocks for high densities of population. CIAM pronouncements, along with ideological trends of the time, influence design principles as well as building production rules*.

At the Unidad Independencia, buildings have been laid out to compose a formal pattern, as it is in the other schemes. These patterns still remind us of the traditional grid-iron pattern (see Chapter 5, Political Function). In addition the concept of the square as a public place occurs in every design. In the U.I. scheme

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*CIAM (1933) advocated that 'The most efficacious production is derived from rationalization and standardization' (G. Hatje (ed.) 1963, p. 71). This statement, together with the rigid differentiation of four functions of the city: Dwelling; Recreation; Work and Transportation, marks a period dominated by mechanical concepts of architecture. See Oscar Newman (ed.), 1961 and G. Hatje (ed.), 1963.

there is a relatively subtle transition between blocks of flats and single or 'duplex' houses.* Pedestrian paths achieved a good proportion and human scale. This already shows an influence from various architectural sources, especially those of Team 10,** and the archievements of new towns in Scandinavia.

In the Alianza Popular Revolucionaria housing scheme, of which a large part was finished by 1976, the mixture of various building types takes a all together different spatial arrangement than the above. Though there are high and low rise buildings, these are grouped with buildings of various levels in such a way that low buildings are located at the edges of the scheme and buildings increase in density towards the centre of the site, where the tallest buildings are built. Here designers attempted to break with certain visual effects associated with the international style. (See Fig. 6.3).

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* It is common to see a non-visual transition between blocks of flats and single houses, or especially when these do not exist in which case high rise buildings seem to be planted on an open ground. Therefore creating an unhuman open void-space characteristic of modern architecture, especially in the international style.

** Team 10 showed its influence since the break with the CIAM Congress in 1953. Afterwards concepts gradually influence architectural movements. Central to Team 10 ideas were the concepts of Growth and Change of Candilis-Woods and Josic. Here is considered that the structure of towns is based on human activities and not in geometry. 'The man in the street' is the real town-builder, and the job of the town planner is to interpret his ideas'. Other ideas became popular i.e. 'The patterns of association, movement, cluster, identity and growth put forward by the Smithsons. See Alison Smithson (ed.) (1968) and Hamilton Balao Cordeiro et.al. (1975-76) CIAM and Team 10, Seminars (9).

Both housing schemes (Unidad Independencia and Alianza Popular Revolutionaria) are organized into sections or neighbourhoods. These usually define the patterns of car circulation, parking areas and clustering of buildings. Parking areas are located mainly at the edges of the neighbourhood units or serviced by secondary roads. Cars and Pedestrian flows tend to be differentiated. It is also common that those sections of the scheme may identify construction stages, in such a way that design and development are totally under control.

At the design stage, the above considerations exert their influence on the agglomeration patterns at the household level (see below), though reciprocally dwelling, building and clusters types affect the urban level of design. (See Fig. 6.4)

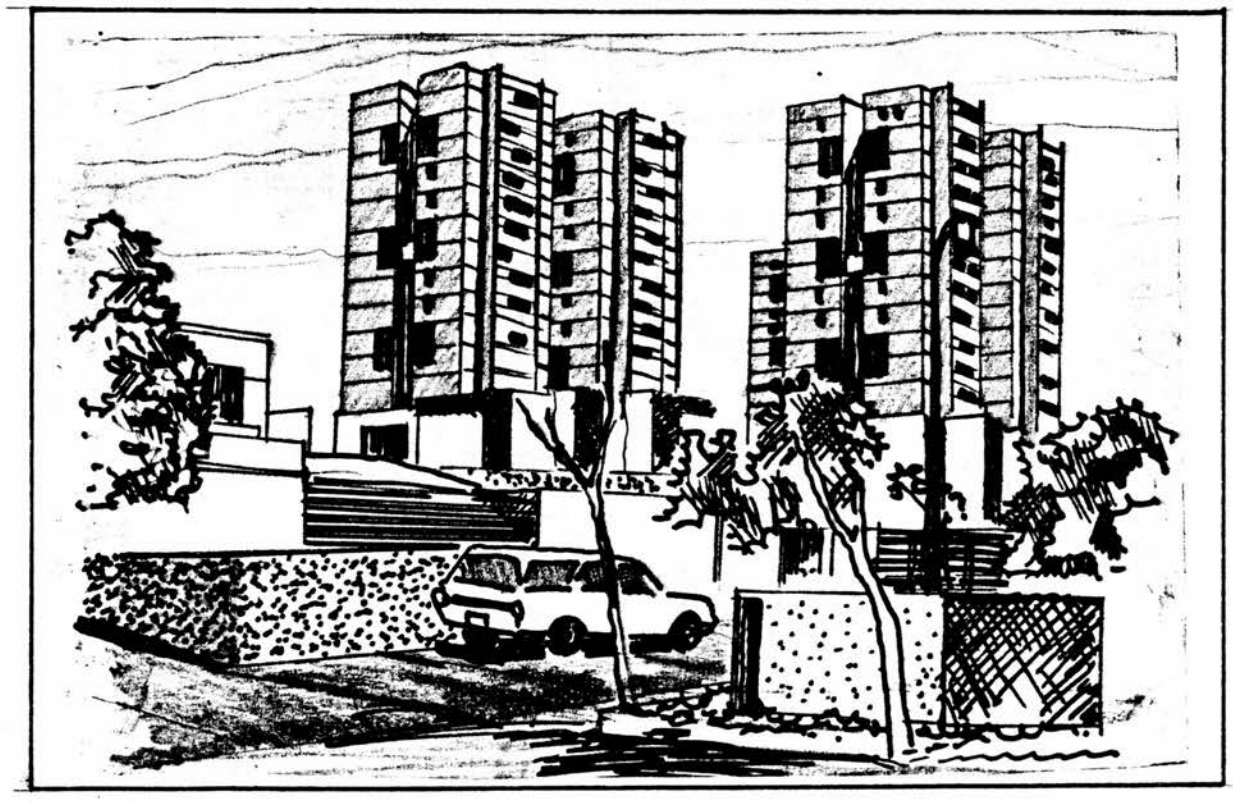

Fig. 6.3. Centrally located towers at the Alianza Popular Revolucionaria housing scheme. The void-space created by modern architecture is still present. Drawing from an authors' photograph 1981.

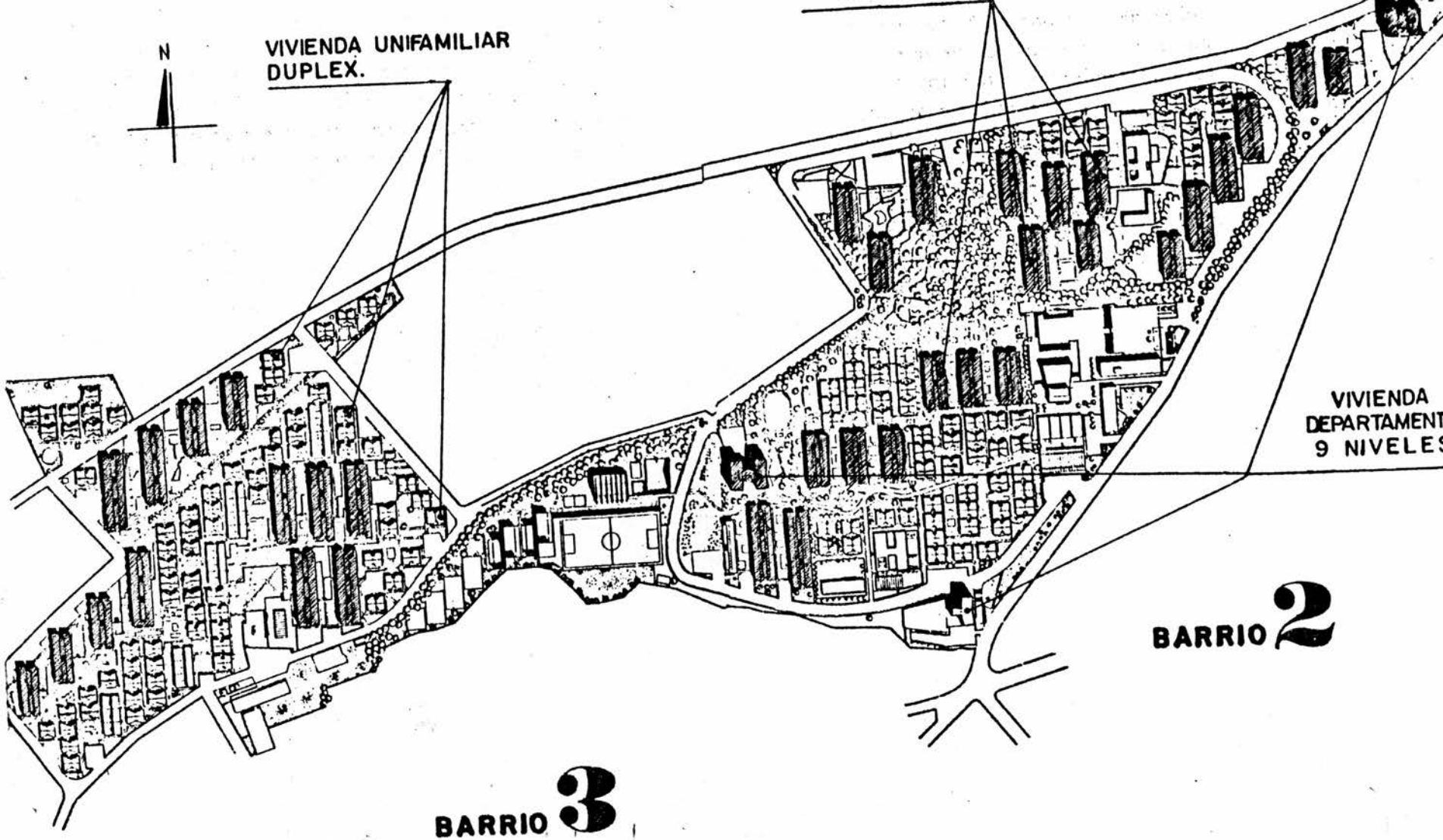


Fig. 6.4. Housing scheme Unidad Independencia, site plan.
Source: A. Siguenza Gómez and O. Contreras A. (1979, p. 1).

Institution: IMSS. Housing Scheme UNIDAD INDEPENDENCIA; built by 1960.

| Dwelling type | No. bedrooms | No. Dwelling Units | % | Sq. M. |
|---|---|---|---|---|
| One family | 2 | 426 | 19.0 | 96.4 |
| House | 3 | 208 | 9.0 | 100.6 |
| Flats | 1 | 91 | 4.0 | 40.5 |
| | 2 | 815 | 37.0 | 61.7 |
| | 3 | 594 | 27.0 | 75.6 |
| | 4 | 100 | 4.0 | 140.0 |

This scheme has 2234 dwellings units of which 634 are one family houses (duplex) and 1600 dwelling units in flats.
It contains a Social Security Centre (Educational/training centre); sport centre with swimming pool; theatre; auditorium; cinema; commercial area with 28 shops; two kinder gardens; three primary schools; nine day nurseries. Its total area is 380 000 Sq. metres.

Source: Gustavo Garza and Martha Schteingart (1978 pp. 211-12)

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Institution: FOVISSSTE. Housing Scheme ALIANZA POPULAR REVOLUCIONARIA; built by 1976 (3054 units built).

| Dwelling type | No. Dwelling units | % | % of the total built up area |
|---|---|---|---|
| One family house | 578 | 14.0 | 40.0 |
| Duplex | 250 | 6.0 | 12.0 |
| Triplex | 726 | 23.0 | 27.0 |
| Multifamily block of flats | | | |
| Three floors | 108 | 57.0 | 20.0 (including towers) |
| Four floors | 304 | | |
| Five floors | 480 | | |
| Six floors | 624 | | |

Source: Pilar Lepe and Martha Arreguin E. (1980, p. 47)

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Institution: DDF-DGHP. Housing Scheme ERMITA-ZARAGOZA; built by 1974-75.

| House type | built up area | cost per unit | cost per sq.m.(M.pesos) |
|---|---|---|---|
| UFA | 16.50 sq.m. | 13 070 | 792 |
| TAP | 27.82 " | 21 070 | 757 |
| TAP-COM | 39.95 " | 26 284 | 658 |
| Edif. 3 | 81.48 " | 96 346 | 1 182 |

UFA, dwelling type: one room and bathroom; TAP, Attic dwelling type; TAP-COM, Attic and shop dwelling type; Edif. 3 and Edif 2. The number of dwellings built by 1975 reached 2569. This is 65% of the total scheme.

Source: Gustavo Garza and Martha Schteingart (1978, pp. 124-125)

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Fig. 6.5. Tables: Three Housing Schemes in Mexico City.

### 6.2.3 Dwelling Level of Agglomeration

Housing protoypes result from the study of users' requirements and trends of household formation, both arranged into socio-economic and client groups.

On the one hand an analysis is required to estimate the total housing needs of a given urban sector and its compatibility with the ability to pay of different groups. This implies an analysis of the locational, demographic and economic factors that describe the city's housing problem. On the other hand it is necessary to establish the user's priorities of demands for housing. Then follows the examination of the various demands expressed by households of different client groups. Subsequently client's demand priorities are converted into design briefs which the designer interprets and translates into three dimensional prototypes.*

Due to the socio-economic conditions of the Mexican population two broad categories of housing programmes have been identified; housing of social interest, and housing of popular interest. The former is addressed to satisfy demands of middle class, the latter to lower classes who in general have fixed jobs. Differences between both programs are related to systems of financing as well as to housing standards. These are reflected in the size of spaces, number of rooms, facilities provided and quality of finishings.

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* For the analysis of this kind see Patrick I. Wakely et.al. (1976) and Building Research Establishment (1977) Third World Urban Housing.

Household formation is very dynamic in a developing country. It cannot fall easily into demographic categories because the structure of many families or extended ones is not simply parents and children. Older people often have children in their household who are not their own but are grandchildren or related in some other way. Low-income households often share dwellings or lots in order to give each other support (see Chapter 5). Among low-income groups household formation is more dynamic than among middle classes; the family cycle is shorter and household extensions are more common. These facts obviously modify spatial relations of behaviour but are also influenced by economic constraints. That is a family of lower income occupies smaller space than a family of the same size but with higher income. Thus patterns of household structure - ability to pay are translated into general housing prototypes.

To develop the housing prototypes, designers make a schematic analysis of space-use activities which hypothetical users ( for instance workers, bureaucrats etc.) might be engaged in. Related activities should be grouped into use areas. These areas are a standardization of the family type spatial needs.

The use-areas are generally identified as a space or a place for living, sleeping, dining; a space for bathing or service unit (bathroom or toilet) and a place or space for cooking. It is normal to consider a place for washing within or with access to an open yard. All space-use activities are zoned in such a way to keep interference from unrelated activities to a minimum. As a result, areas of interconnection help to

organise space. These are kept to a minimum areas for circulation. It is common rule to integrate two areas. Thus having a living-dining together as a single double-room space. All other use-areas remain as independent spaces. Cultural patterns of behaviour play a very small role in the shaping of house form (in this particular example of housing prototypes of which reference is made later) intead the architectural culture dominate in the decisions takes to organize space and the resulting built form as it is for instance the case of the dining-living space which evolved from the space flowing or open planning conceptions.*

> "Contemporary house planners call the concept of flowing space 'open planning', as distinguished from that space which is cut up into separate cubicles. The practical application of this theory effectively increases one's usable, interior space. Visual space and usable floor area are, essentially, enlarged with demarcations made by adjustable partitions rather than those made by solid, stationary walls. The corollary of open planning is its economy of space. This flexible multiuse of space with its overlapping activities can, indeed, effectively reduce the overall need for floor space.... and can ultimately reduce building size and cost." (Ken Kern 1972, p. 102).

Use-areas, especially the areas for bathing, washing, as well as cooking (including storage and preparation of food), have been transformed by technology to a point where all earlier constraints have been abolished.

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* It was Frank Lloyd Wright who first introduced important open planning concepts into residential design. For a more spacious feeling, he integrated living, dinning, and kitchen functions. His ideas have barely trickled down into the mainstream of conventional architectural practice and expression. Other concepts of similar nature were developed by architects representatives of the modern movement. See for instance Frederick Gutheim (ed) (1974) and Vicent J. Scully, Jr. (1960). For a comprehensive study on space see Cornelis Van de Ven (1980).

In the core of architectural theory and practice, ideas about the servicing of the house were central to what become known as the modern movement.*

Dwelling protoypes generally consist of one, two, three or four bedrooms, plus a larger room for dining-living, a bathroom and kitchen. A small backyard is generally integrated and circulation areas are required.

The spatial organization of the dwelling-cells are clearly defined in the following examples:

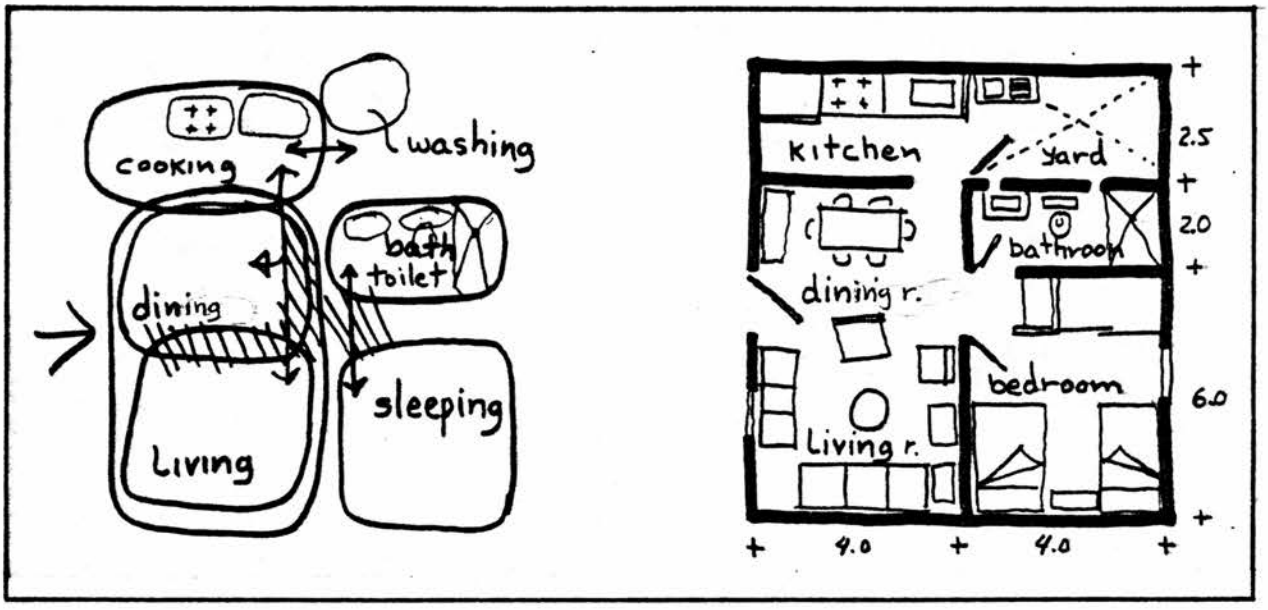



Fig.6.6.Dwelling-cells as particular use-areas in the design stage transformed into final design.

Source: For built plan from the 'Unidad Independencia' (Mexico City), Vivienda Multifamiliar R-1. Alfredo Siguenza Gomez and Orlando Contreras Alvares. (1979 pp. 27-29).

*For some references dealing with these transformations see Pedro Guedes (ed) (1979) pp. 200-224.

The above dwelling was planned to house a minimum of two people, husband and wife, or a maximum of a nuclear family of four. Considerations for family growth are not planned on the basis of room extensions, which regulations forbid , but on the basis of number of beds per room, and number of people per bed. This particular dwelling is occupied by the lowest income families of the 'Unidad Independencia' housing scheme.

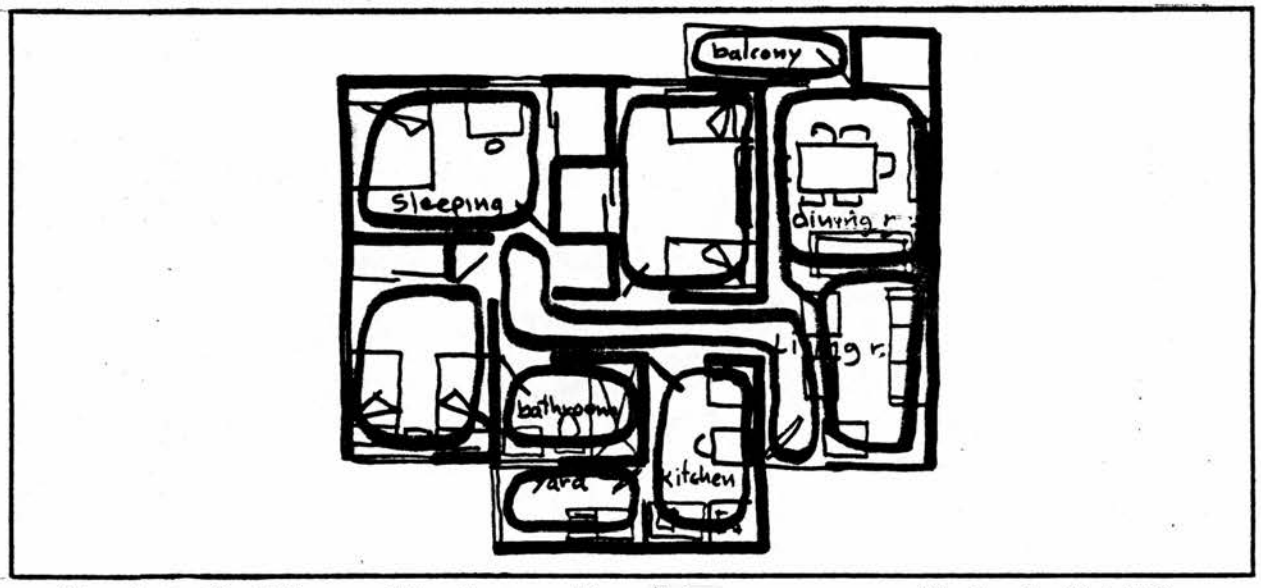



Fig.6.7. Dwelling cells demarcating their own space. Vivienda Multifamiliar R-3. Scheme: Unidad Independencia. This flat can accommodate 6 to 8 people, including grandparents. The agglomeration of dwelling-cells at the design stage takes effect by taking into account functional/behavioural relationships, thereafter thedesign is shaped by climatic, site, structural etc. factors. It is also affected by the arrangement of clusters of flats or houses at higher levels.
Source: A Siguenza G. and O. Contreras A. (1979 p.20).

Dwelling prototypes belonging to housing programs of popular interest develop in similar fashion, though in this case the standard are lower. For instance dwellings are designed for nuclear families or households which will occupy one single multi-purpose room (in some cases, with one extra bedroom) with bathroom and sometimes with cooking area in a

separate room.

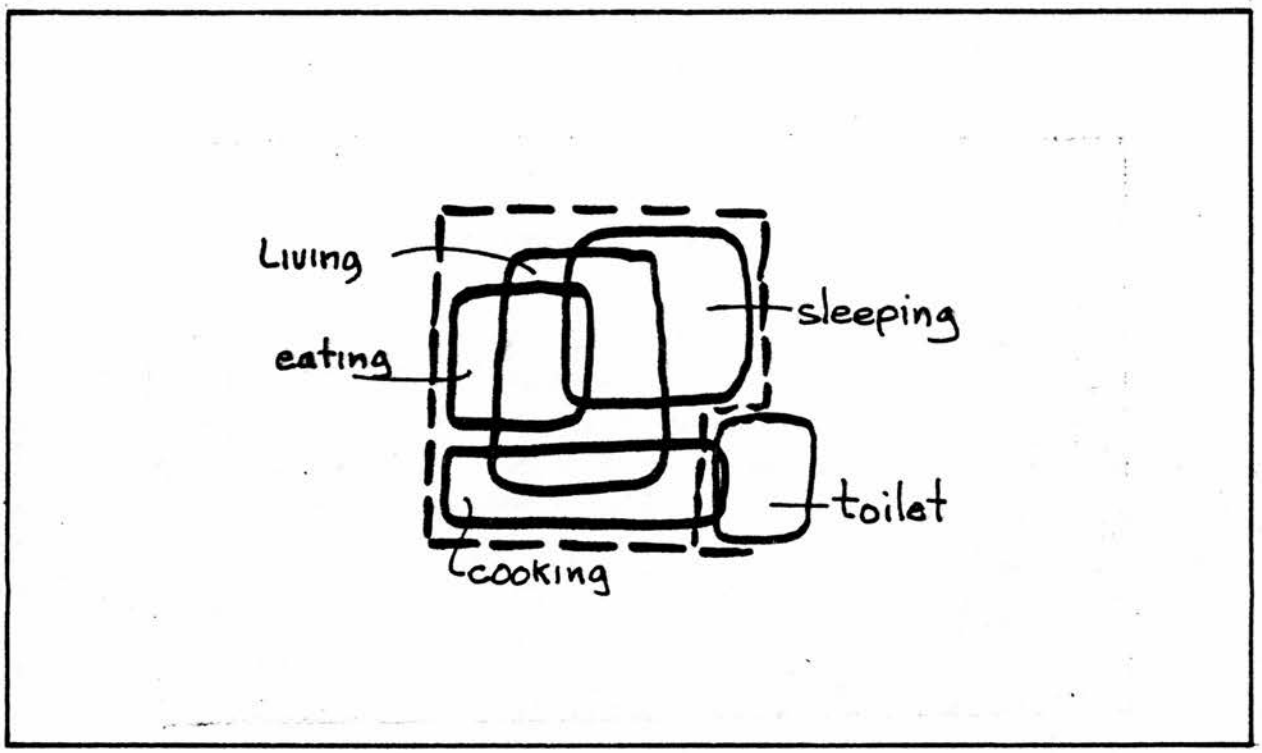



Fig.6.8 Schematic analysis of space-use activities for space with multipurpose use.

Use areas are overlapping, thus dwelling cells cannot be differentiated, a single space becomes multi-functional. This has been put forward as a solution type (see later the prototypes), which is a response to the demand for cheap housing. It has been developed by analysing the living conditions of low-income groups especially in the inner city vecindades. See the following example (figure 6.9).

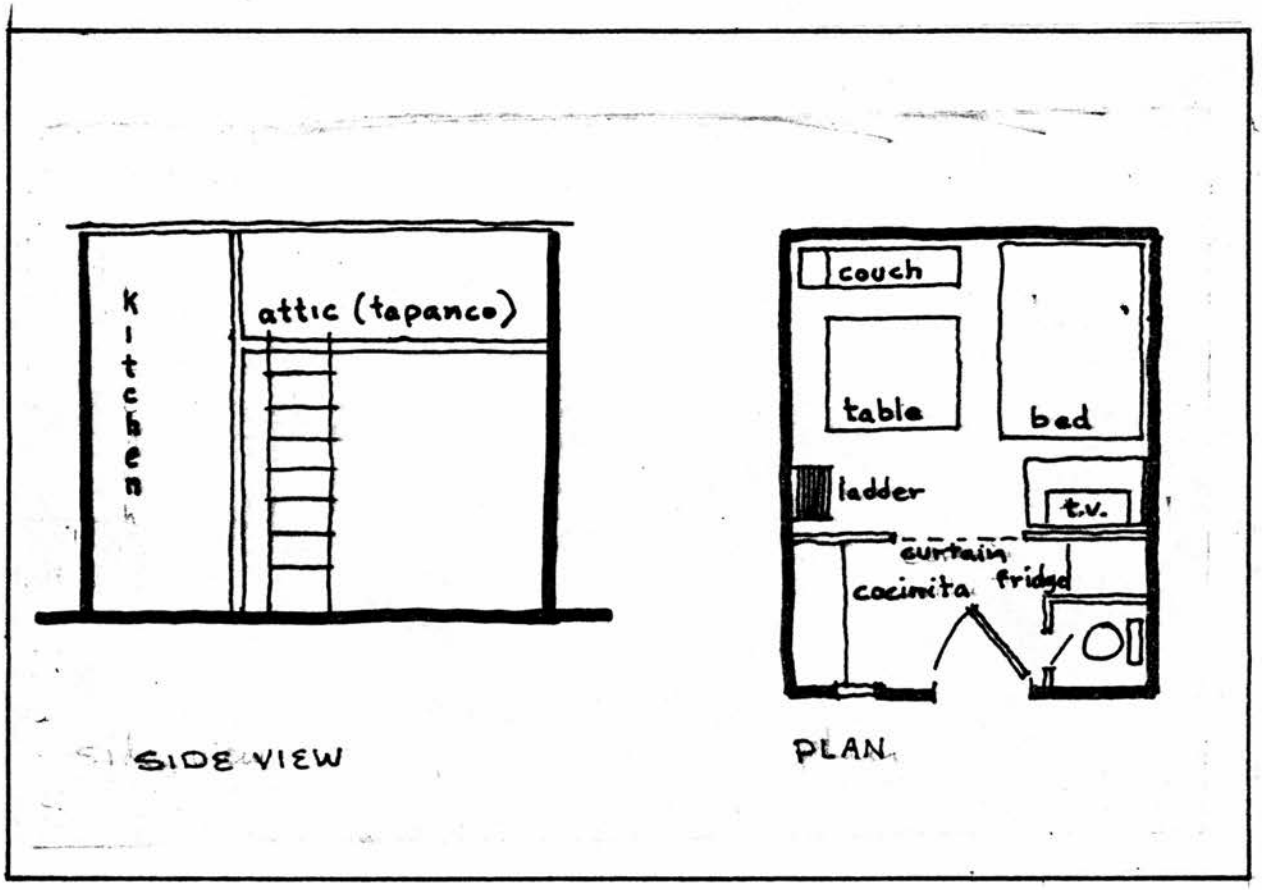
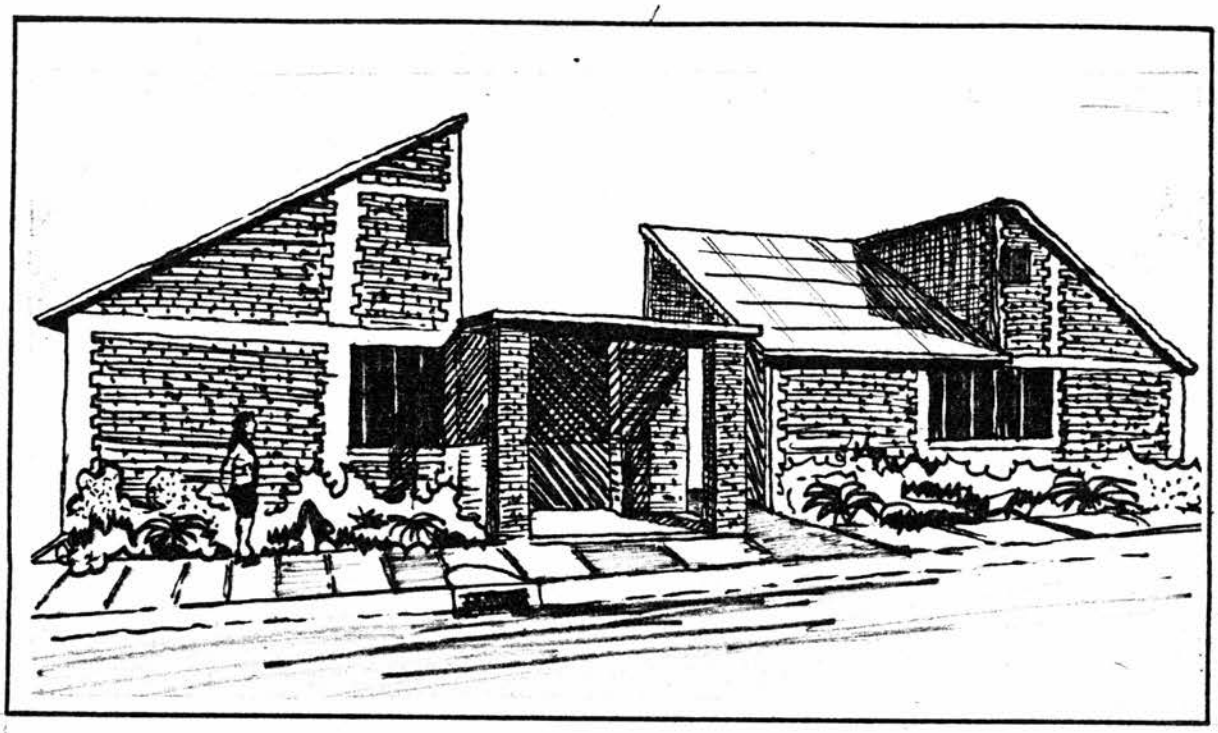



Fig.6.9 Subdivision of space in a typical dwelling unit in a purpose-built vecindad. Cerrada Diaz de Leon 16, Tepito.

Source: Peter Ward (1976 p. 75).

The plan and section of a dwelling unit in a vecindad show that a single room is subdivided. The central activities of a dwelling take place in the major space. That is sleeping, eating and living. This room has a second level an attic (tapanco) where extra sleeping space is provided. Kitchen and toilet are in a separate small space.

From the previous examples we conclude that the higher the income of client groups, dwelling prototypes are provided with a higher differen-



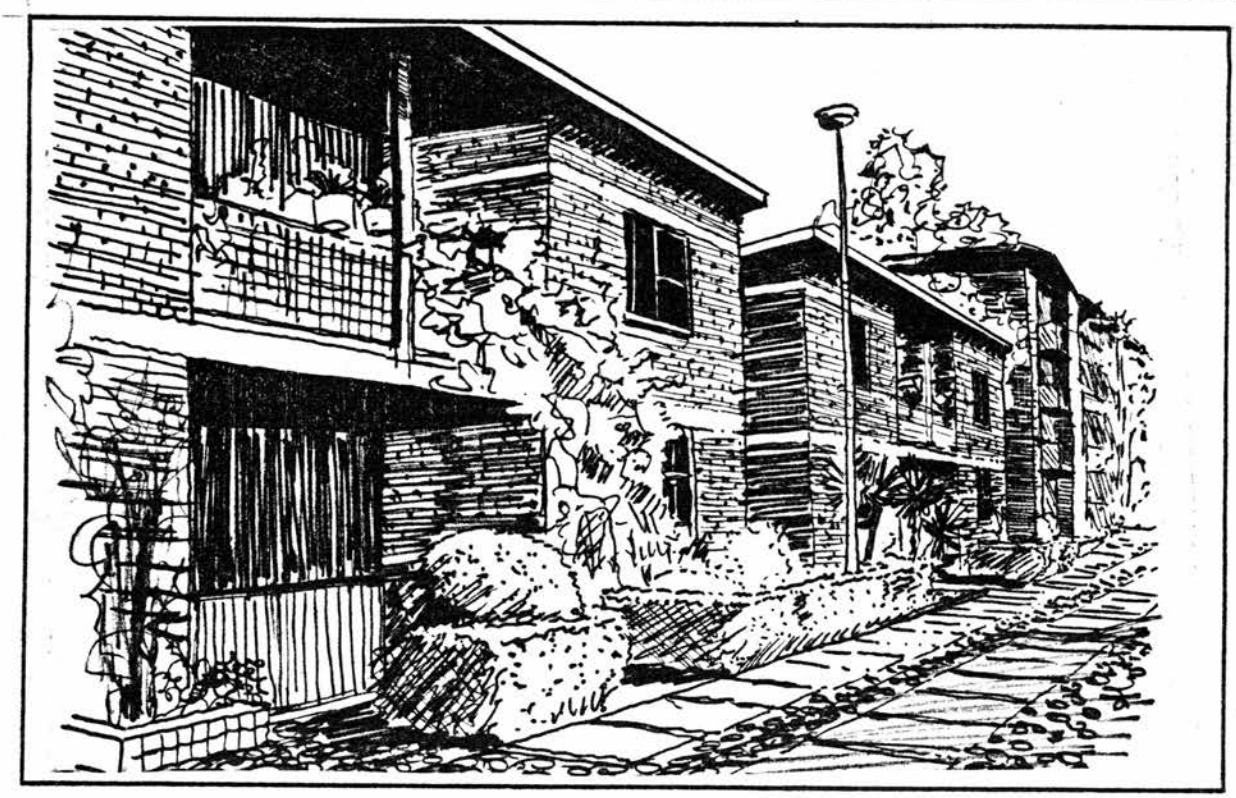


Fig. 6.10. 1) The houses type; TAP (with attic) and TAP-COM (with attic and shop) at the Ermita-Zaragoza Housing Scheme. This idea evolved from the conditions of subdivision of space in a purpose-built vecindad (see Fig. 6.9). 2) Low-rise 'duplex' houses at the Unidad Independencia Housing Scheme.
Sources: 1) Drawing from an author's photograph, 1974. 2) Drawing from a photograph, in A. Siguenza G. and O. Contreras A. 1979.

tiation among use-areas or dwelling cells.

Taking into account the above description we can classify the housing into the following dwelling prototypes*.

1. Single house. Houses with two, three or four bedrooms, kitchen and bathroom, designed for nuclear families. Design is compact with a minimum of interior circulation. Each house is built in a single plot. Minimum bedroom area 9.00 sq.m.

2. Duplex/triplex dwelling. A single building of two or three floors subdivided into two or three dwellings. It contains two or three bedrooms, kitchen and bathroom. It has 46 to 91 sq.m. per dwelling.

3. Flats. In buildings of 4 to 5 floors. It contains one, two, three or four bedrooms, kitchen, bathroom and a yard. It has 60 to 82 sq.m. The distribution reduces the internal and external circulation to a minimum.

4. The basic housing (la vivienda base) containing living-dining space, kitchen, bathroom, one bedroom and a yard. Construction here is permanent in plots of 108 sq.m.

5. The model house (la vivienda tipo) contains a minimum built-up area in plots of 90 sq.m. It has a room used for cooking, sleeping, eating and a bathroom with an exit to the yard where there is a washing place. All together it has 18 to 20 sq.m. of built-up area. Rooms can be added.

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*This classification has also been deduced from G. Garza and M. Schteingart (1979), pp. 117-120.

5a. The attic house (la vivienda tapanco). It has similar characteristics to the previous one but it has an attic which is designed to be used for sleeping. This attic can accommodate two double beds with minimum circulation area. Thus it is practically a room with two floors.

5b. The attic-shop house (la vivienda tapanco-comercio). It has similar characteristics to the previous one but it has an extra space for a shop with access from the street. The total built-up area is 46.7 sq.m. It can be extended 25 sq.m. more.

5c. The workshop house (la vivienda taller). It has similar characteristics to the model house but it has an extra room of 20 sq.m. in the back side designed to be used as a workshop.

6. Cardboard house. Provisional cardboard structure assembled in an urbanized lot of 90 sq.m. (this dwelling type is not designed for new large projects).

These dwelling prototypes are incorporated into housing projects, medium and large scale, according to density required for each case. Thus at the planning and design stages interaction between urban and household levels of agglomeration occurs. Designers 'control' design, though following

| Kinship | Household/ Dwelling type | Dwelling Structure Specification | Agglomeration Patterns (household level) |
|---|---|---|---|
| Nuclear family and extended household | Single house in a single plot | Two, three or four bedrooms, living room, dining room, kitchen, bathroom and yard. Often with private garden. |  |
| " | 'Duplex'/Triplex' Two or three dwell. in a single plot | Two or three bedrooms, living/dining and core services (Kitchen, bathroom and yard). Buildings of two or three levels. Plot: 55 sq.m., dwelling area: 46-91 sq.m. |  |
| " | Block of flats and towers. | Buildings of 4 or 5 floors and high rise towers. Area per flat: 60-82 sq.m. with three or four bedrooms, living/dining, and core services. |  |
| " | The basic house (vivienda base) | Detached or semi-detached structure; one bedroom, living-dining space and core services. Plot: 108 sq.m. |  |
| " | The model house (vivienda tipo) | Structure as above. It has one (multifunctional) room, bathroom and yard. Built up area 18 to 20 sq.m. | |
| " | The attic house (vivienda tapanco) | Similar to above, but it has an attic to be used for sleeping. |  |
| " | The attic-shop house. (tapanco-comercio) | Similar to above, but it has an extra space for a shop with access from the street. Built up area: 46.7 sq.m. It can grow 25 sq.m. more. | |
| " | The workshop house (vivienda taller) | Similar to the model house, but with an extra room in the back of the house of 20 sq. m. | |
| " | The cardboard house | Provisional structure for 'fraccionamientos populares'. Cardboard structure assembled in a urbanized lot of 90 sq.m. | |

Fig. 6.11. Table: House prototypes promoted by mexican housing institutions
Source: After G. Garza and M. Schtengart (1978).

the existing regulations. The formation of agglomerational patterns are guided by architectural conceptions accumulated at a given historical period. The boundaries of dwellings are strictly defined. Private and public domains are well demarcated specially in blocks of flats. This emphasizes the isolation of nuclear households. Standardized flats means that ways of life are imposed upon individual users' needs and priorities. Users'choice, at the end of the production process, is left to be determined by their income. Household formation unfolds within the rigidity of fixed designed dwelling prototypes.

## 6.3 THE ECONOMIC ARCHITECTURAL FUNCTION

The demand of housing at the regional level is correlated with the housing needs at the local level. Housing needs and infrastructure requirements are identified, and special attention is given to potential demand (see political function) ir order to develop the programme of production of dwelling units.

The selected site should, in general, fulfil the conditions for a viable development upon which other institutions would eventually participate to complete its urbanisation.

The suitability of the site is checked up in terms of: its temperature, humidity, altitude, and direction of winds; soil erosion, swamp, rainfall; proximity to insanitary conditions; depth of soil; presence and value of trees, the topography of the site and character of the surrounding built up area etc. And also the conditions of utilities like

water, light, sanitary services etc., as well as existing and other community facilities. Land for this type of project is generally located in the city's periphery. Land is owned or expropriated by the Government. Land as object of labour is being gradually transformed generally into large scale projects. The result of large investments are housing area commonly known as 'unidad habitacional' or Estate housing units.

Building process transformations, organization of operations and sequences of assembling take the following form. Due to the variety of operations of large projects occurring simultaneously particular attention is given to the critical path method and other management techniques to programme in advance its correct sequence of site operations. This implies a rationalisation of site operations which is also encouraged by the substitution of new materials and introduction of new technological methods.

Building requires architects, quantity surveyors, structural engineers and building services engineers. Directly at the site, building operations are conducted by its operatives and these can be identified in general in the following list:

Main groups of operatives employed by contractors and local and central Government.

Carpenters and joiners
Bricklayers
Bar benders and fixers
Electricians
Floor, wall and ceiling tilers
Glaziers
Masons
Mechanical plant operators
Plumbers
Drainlayers/Pipelayers
Plasterers
Pavers
Painters
Roof slaters (and tilers)
Scaffolders
Steel erectors and sheeters
Other building and civil engineering crafts
Transport drivers and manual workers in warehouses
Welders

They participate in the process of construction at distinct stages. Though some building operations might take place at the same time we can identify the following building site activities grouped in construction sequence:

1) Preparation of the worksite
2) Excavation and foundations
3) Site services
4) Structures; concrete and structural walls
5) External cladding
6) Interior walls
7) Installations
8) Fixing and finishes; decorations
9) Special installations.

These groups of sets of building operations are an indirect appropriation of nature but a direct appropriation of the transformed finished transitional products; these transitional products have been prefabricated by either a simple or complex process. The assembling operations in the site, independently of the prefabrication processes undergone by building elements and parts, can also be either simple or complex or in some cases a combination of both. Simple and complex building operations can be continuous or organized alternately, and can be unitary within each level but both are not necessarily complementary; that is because task are distributed according to skills and degree of complexity and specialization required at particular building stages.
Building operations grow in complexity and this encourages their rationalisation in order to control their cost and performance.

Motivate power for transforming the building elements and parts into

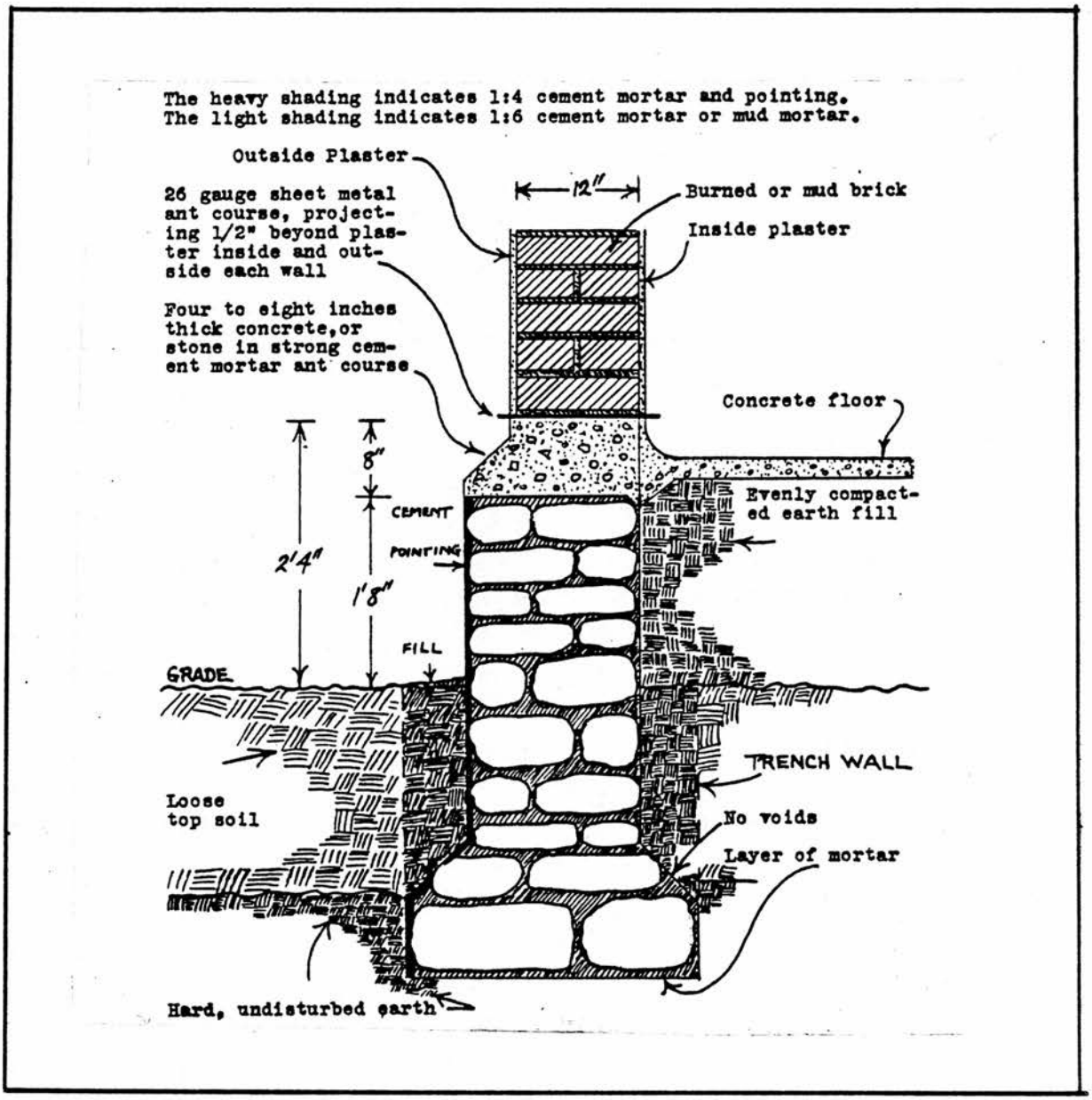
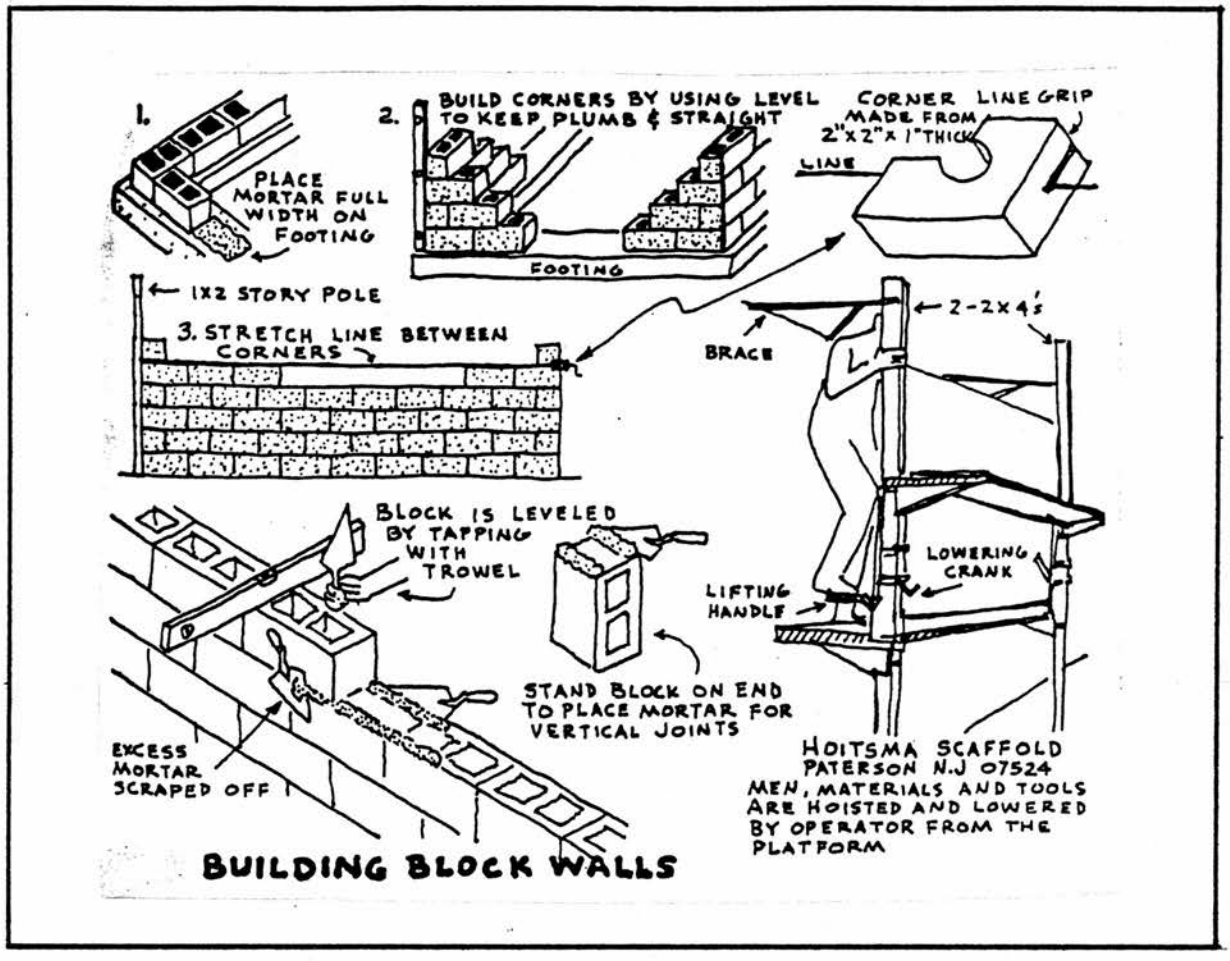



Fig. 6.12. Drawing of foundation
Source: H.K. Dancy (1948/78, p.66).



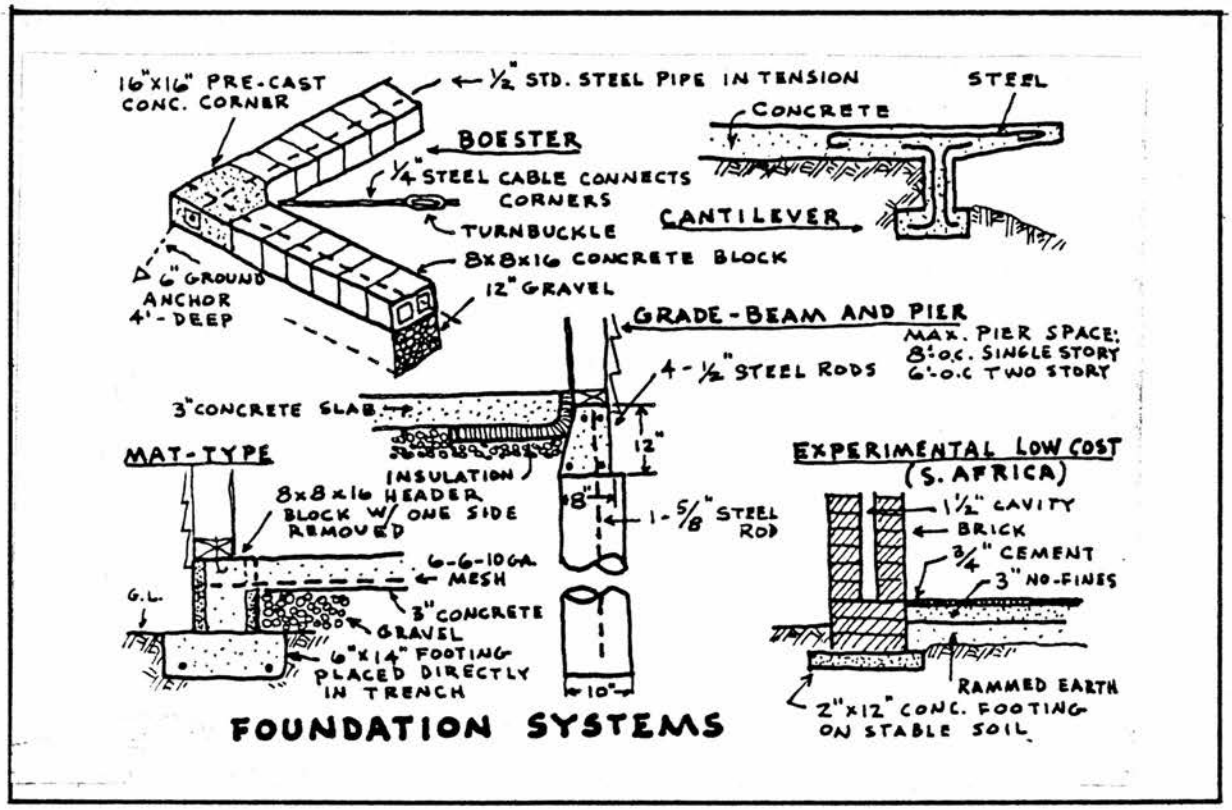




Fig. 6.13. Building Block Walls and Foundation Systems.
Source: Ken Kern (1972 pp. 183 and 272).

architectural products varied from the use of human hand and specially assisting tools to partly mechanized processes. Tools of diverse nature are mainly the instruments of labour, though mechanisation of certain processes is widely employed. For instance in recent years a number of operations of stressing or jacking up to assist the construction process have been increasing. (Pedro Guedes 1979 p. 193) the use of mechanical power is restricted to some operations.

> "Mechanical plant used on site is generally limited to activities involving demolition, excavation and pumping; concrete mixing, transporting and placing; crasses and hoists; and electric and pneumatic hand tools." (NEDO 1978 p. 20).

The size and composition of the labour force and the plant employed on a site are determined by the location, design and size of the project; as well as by the degree of mechanisation of processes used and prefabricated units employed and as part of this; the method of construction including any temporary work necessary to construct the permanent work (e.g. scaffolding, formwork, etc.). For example,great differences exist, in some operations, between the construction of a single house and a high rise block of flats.

In a single dwelling house built with traditional materials using labour intensive and many skills e.g. carpenters, bricklayers, tilers, plasterers, plumbers, electricians, painters etc., the mechanical plant required would be very little: perhaps a very small excavator shovel with a trenching attachment would be used for a very short period, otherwise the most common excavation is done by men using shovels or using a mobile crane.

That is at the start of the construction to strip the top soil and dig the foundation and drain trenches. A small concrete mixer for foundation and over-site concrete, drain beds and surrounds, floor screeds, mortar mixing, etc., would also be used.* Non-mechanical plant required would be scaffolding and small plant and tools such as wheel-barrows, picks and shovels, and maybe some electric hand tools.

In a high rise tower block constructed with reinforced concrete in its structure; brick walls and maybe large windows, some mechanical aids are most commonly used. For instance one or more tower hoists would be required for elevating men and materials to the upper floor levels. A concrete mixer is required for any on site concrete work. Excavation would be done by using larger power shovels or cranes.

Some building operations can be unitary (one operative controlling one operation) but they can rarely be complementary; this means that one party cannot control two different operations. If we see the sets of sequential building operations we find they are decomposed by an elaborate division of labour. Building operations are carried out individually but especially requires teams in both simple and complex tasks. They are generally specialized for particular building trades. Government housing processes can include a wide range of levels of building operations; whereabout employing simple skills or applying highly skilled

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* The most common concrete mixing in Mexico are:
a) using manual labour with shovels
b) using portable concrete mixer
c) factory pre-mixed concrete
Out of which the latter, according to G.K. Boon (1973) resulted to be the most expensive. There is a slight cost difference between the first two systems. See G.K. Boon. Employment Creation by Technology and Output Variation in Housing in Mexico, in G. Araud et.al. (1973).

knowledge. Ordinary building skills are acquired in apprenticeship and higher skills in centres of training and education. Highly skilled knowledge varies in degrees of complexity applied to the organisation of site and management of production; for instance to the design, calculations and assembling of structure and installations. Sophisticated manual and mental operations are identifyable especially in large scale production; there, highly technological levels of building operations are often employed, for instance in the design and construction of concrete or steel structures or in the production of prefabricated walls, roofs or rooms or in special installations. Labour and plant may be employed directly by the main contractor or authority, or indirectly through sub-contractors. Teams of builders are directly or indirectly contracted or sub-contracted by the Government. This depend on the type of housing sub-process; namely internal or external housing promotions: (see the Political Architectural Functions), in both wages are the dominant form of labour relations.

## 6.4 THE SYMBOLIC ARCHITECTURAL FUNCTION
(Interacting with the Political and Behavioural ones).

The symbolic architectural function refers to the semiological properties of the housing product. Yet, when we take into account the meaning pregnant in the various morphological levels of housing, they necessarily bring into play the processes of production with the ideas and values involved. Meanings and values inherent in the processes are reflected in the product. Processes and product, especially in this architectural function must be seen as one. In addition, the social evaluation of the content of the housing images must be considered.

Three distinct ideologies play a role in this housing process. The Government ideology shared by professionals and politicians embodies the concepts or beliefs of progress, efficiency, large-scale, low-cost,and contemporary. These are expressed in various dimensions of the process and are interrelated with planning and architectural ideologies. Finally the dwellers' modes of living come in to conflict with the imposed built form and suggested way of life.

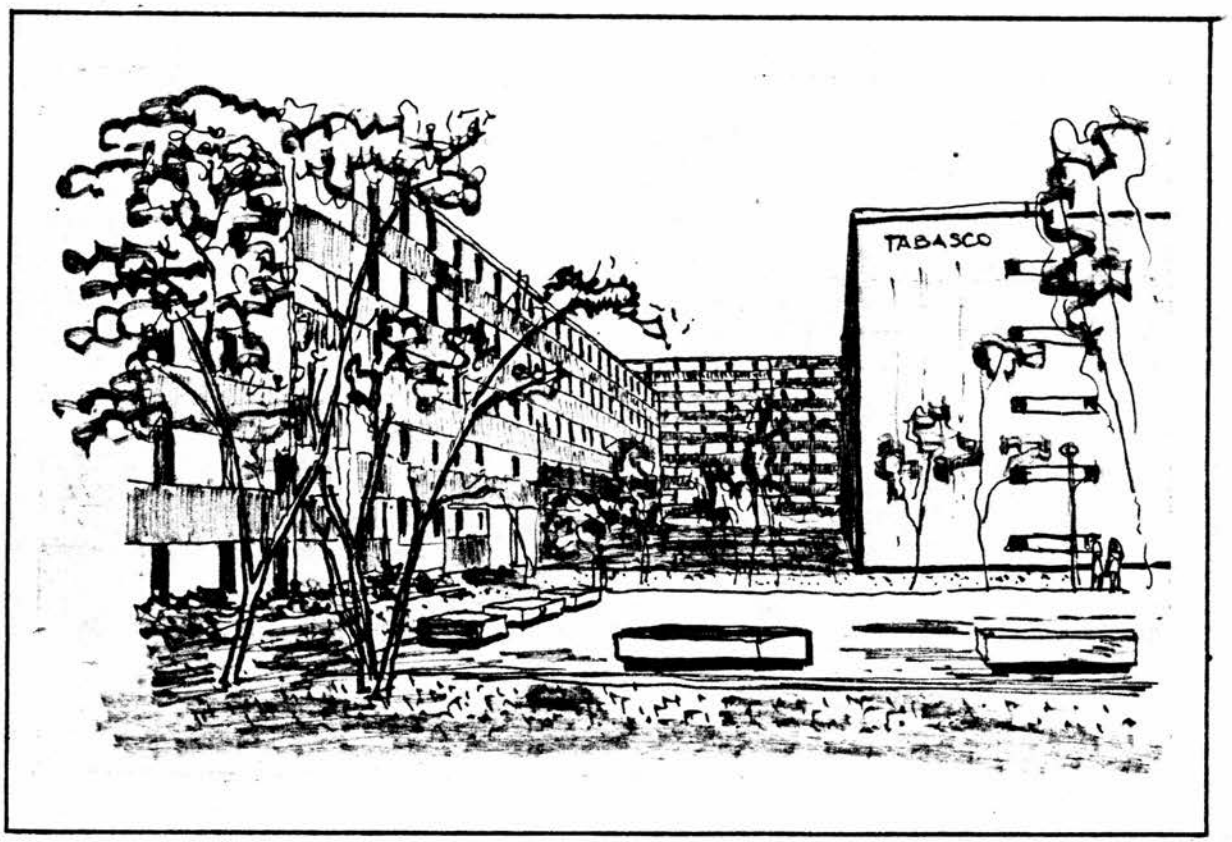


Fig. 6.14. Blocks of Flats at Nonoalco-Tlatelolco housing scheme. Drawing from an author's photograph, 1968.

Planning and architectural ideologies develop hand in hand. While planning advocates the central concept of public interest,*

* For an exploration of this see Jane and Roy Darke (1979) p. 127. In the Chapter 7 Professionals and housing.

architecture is concerned with spreading concepts, conveyed in built form, which are supposed to meet general acceptance. This is not a general sistuation in the Government housing process since the discrepancy in values between those who authorize, plan, and design the buildings and those who live in and use them is often enormous.

This situation emerges from the lack of communication between professionals and dwellers, and from the consequent imposition of values by the designers, in addition to the socio-economic constraints that embodied in the production of mass housing.

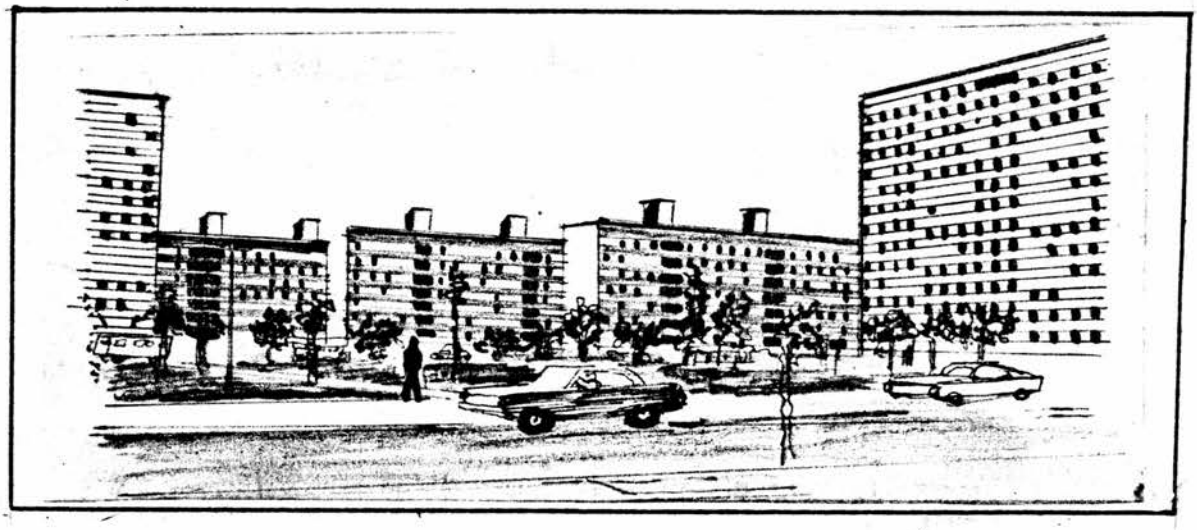

Fig. 6.15. Blocks of Flats at Nonoalco-Tlatelolco housing scheme. Drawing from an author's photograph, 1968

Both planning and architecture share a common belief in rationality. Planners and architects believe that the environment can be manipulated to create wide social benefits and that rationality will provide the objective means to those ends.

> "Policies based on fact and rational argument should be acceptable to all interests and form the basis for a consensual approach to change. (J. and R. Darke, 1979 p. 127).

Rationality in practice is expressed in every single urban planning and architectural concept for instance in density control, zoning of land uses, the neighbourhood concept, parking and services, the separation of pedestrians and cars, the standardisation of use-areas in design and the consequent dwelling-solution types. Rationality is expressed all throughout the production process (see the Political Function).

The growing demand for housing and the ever lengthening number of potential low-income clients foster the introduction and recent increase* of Government housing programmes, whose primary objective has been to produce low-cost housing in the so called popular and social interest.

Low-cost housing had been welcomed and pursued by the modern movement in architecture. Then it has been totally permeated by the international style.

One of the underlying premises of the international style was the assumption that an acultural approach to design is possible. It's been assumed that most life-styles can adapt to western building forms and that the understanding and acceptance of building forms will be similar

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* The production of housing by the state and financing programmes increased in 1972, due to the creation of housing founds. Between 1947 to 1964 the average number of houses built per annum was 6,734; this increased to 19,960 between 1965 to 1970 but between 1971 and 1976 the production increased to an average of 53,008 houses per year. (COPEVI, 1977, cuadro 10, p.89).

across cultures. Although there is a growing concern about it, this attitude is still fostering the standardisation of dwelling solution-types and the attempt to standardised building systems, elements and parts. This leads to the design of housing prototypes which are meant to fulfil the demand of socio-economic client-groups. These housing prototypes arranged in a housing scheme becomes symbols of modes of consumption and ways of life.

Low-cost housing has been approached with sympathy and emotion, but it was not intrinsically a more economical building than any other. Modern architects' concern for economy and rationality has been aesthetic and symbolic in nature; their designs were not really technologically advanced, especially in public housing, or socially committed, they only communicated or symbolised social and technological ideals.

All the above arguments are found in any housing scheme. For instance, the housing scheme called The Alianza Popular Revolucionaria located in the south of Mexico City has the following characteristics; high and low rise buildings are grouped with buildings of various levels. Low buildings of one and two floors are located at the edges of the scheme, and high rise buildings; towers, are carefully placed in the centre. Between low and high rise buildings there is an area of transition occupied by blocks of flats of three, four, five and six floors increasing the levels towards the centre of the scheme. A multiplicity of signs in the organization of space and built form exist. These express on the one hand, through building types, class membership and status differentiation. Each building type promote a particular way of living. On the

other hand it has been attempted to symbolise the power of the beauro-cracy * since the scheme become a landmark in the area. In addition to this, FOVISSTE's shopping centre occupies a dominant location.

Clusters of building types and agglomeration of dwellings imply an arrangement that would firstly maximise the overall land use by minimizing dwelling's space; optimization at minimum cost, and secondly that social 'contact' among neighbours should be likely to occur, though without generously providing spaces to facilitate this encountering. This is specially clear in blocks of flats where no transitional area exists between public corridors and stairs and private dwellings, furthermore. Because of the disposition of flats the families are likely to remain isolated. This contributes to accentuate the alienation of dwellers which is mainly due to their lack of participation in design and later in the maintenance processes. Furthermore to change the spatial arrangement is not only forbidden but it is also impossible. These conditions of unchangeableness in which dwellers cannot modify their dwellings according to their needs and priorities bring about that feeling of powerlessness.

The situation for duplex and single houses is slightly different. For instance in the scheme to which reference is being made, in spite of the restrictions to modify the original design, the dwellers managed to build

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* Pilar Lepe and Martha Arreguin (1980) made this observation. This housing scheme is especially different from others which had been designed for peasants or working class.

walls and fences to mark out their private property and give a touch of identity. In addition this is meant to increase the feeling of protection. Other types of changes (e.g. changes of materials of facades etc.) attempt to enhance the status of the family. (See P. Lepe and Martha Arreguin 1980)*.

The multiplicity of signs the housing estate is charged with, originate in the various ideologies of the principal actors of the housing process; planners, politicians and architects and at last the dwellers. The Government housing schemes are characterized by the generally paternalistic and negative images they convey to their inhabitants and the occupants' feelings of being neglected, ignored, and treated impersonally.

> "What becomes significant in a study of building form and function as types of environmental messages is that the buildings may be expressing a set of values and objectives different from and inconsistent with those held by the persons inhabiting the space, however congruent they may be with those held by that part of society responsible for creating these structures." (F.D. Becker 1974, p. 7).

## 6.5 THE CLIMATIC AND BEHAVIOURAL FUNCTIONS

The climatic and behavioural architectural functions will be described in relation to basic assumptions made by designers, especially in Mexico

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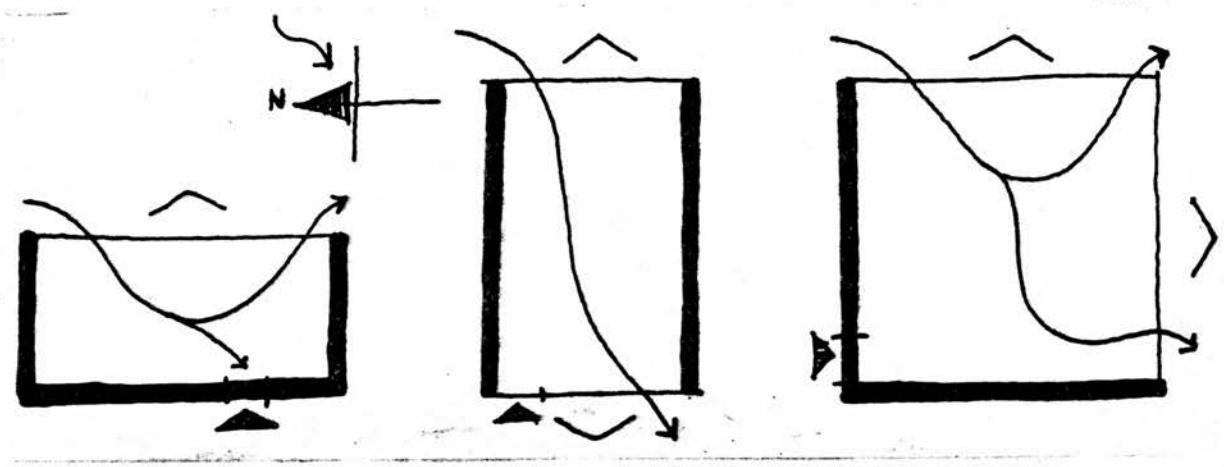
*The investigation carried out by Pilar Lepe and Martha Arreguin (1980 pp. 78-79) shows that 58% of the sample of inhabitants living in this housing scheme (Alianza Popular Revolucionaria) have preference for the houses outside the scheme, in the surrounding area. They found them spacious and beautiful. These houses belong to upper middle classes and are designed by architects. These findings are the result of asking dwellers to compare their houses with those outside the scheme. Otherwise a large majority is satisfied with the housing area especially because of the abundance of green areas, in spite of their multiple fragmentation.

City. Climate in Mexico City is variable throughout the year, nevertheless it does not go to extremes. Average temperature is 21°C and is identified as temperate/dry, in both summer and winter (H. Caminos and R. Goethert, 1975). Rain is not constant and lasts for a few months in the summer (June-September). Dominant wind direction is north-east. Air temperature changes from 12° to 18°C: throughout the year this indicates that air temperature and relative humidity and climate in general can often be relatively comfortable*. Mornings can be cold and evenings cool. Midday in summer can be quite hot and winter nights relatively cold.

Climatic conditions of the site are identified and analysed in order to determine the site's suitability for development. This should take into account the influence that climate might have in the physical design and also how design could modify the climatic fields. These considerations for climatic modification affect the design of groups of buildings (neighbourhoods) and plots, circulation (for pedestrians mainly), buildings and its subsequent subdivision into dwelling cells or use areas.

Low rise and multifamily/high rise buildings are the basic types in the housing schemes. Each type with its own morphological variations;single family house, 'duplex', 'triplex', semi-detached etc. for the former and block of flats (5 floors) and towers for the latter. Within these building types we can identify, according to orientation, three dwelling unit types; these are the frames within which dwelling-cells are arranged by the designer. The dwelling-frame unit types are shown in Figure 6.16.

*Comfortable air temperature should be between 15° to 18°C for working and between 18° to 20°C for resting. Comfortable air relative humidity should be between 50% to 60% for working and 40% to 70% for resting. See Horacio Caminos and Reinhard Goethert (1975) for design of site and services projects.




1. Single orientation unit.
2. Double orientation unit, open ended.
3. Double orientation unit, open ended.

Fig. 6.16. Orientation and air flows possibilities of three basic dwelling-frame units.
Source: After Roger Sherwood (1978 p.3).
The orientation and prevailing wind direction is for Mexico City.

According to Roger Sherwood (1978) three basic apartment units are suitable for repetitive use; single or double orientation units with two options.* Obviously single or 'duplex' houses may have treble orientation or open to all possible ones. Alternatively or besides this a small yard may also have a climatic function (see plan one bedroom house)

*Roger Sherwood (1978), identifies few variations for each orientation unit type in which the distribution of dwelling cells change, specially the core services (and stairs when applicable) location. He made a good selection of plans of housing designed by well known architects (in USA and Europe). He identifies building types according to type of access to the flats, types of vertical circulation, corridor type and subsequent grouping of flats. Then he groups housing into detached and semi-detached, rowhousing, party-wall housing, block of flats, slabs and towers.

Each one of these dwelling unit types has several variations as it becomes a dwelling prototype (see Political Architectural Function). The variations depend upon the positioning of core elements - kitchen, bath and stairs (when used inside the unit) the entrance options, the depths necessary for natural light and also the location of the yard.

Preferable orientation for buildings and lots in Mexico City is east-west (see Unidad Independencia plan). Internal climatic modification aim to provide good conditions for body comfort. This is done through controlling, if necessary, sun radiation, air motion and temperature, humidity and precipitation. The control of environmental elements is exerted through the design of the building and its elements (e.g. windows, screens etc.), the implied arrangement of dwelling cells and the use of materials.

The spatial organization of dwelling cells, each one with its own orientation preferences, within the given dwelling orientation, becomes a basic tool of designers to influence the climatic architectural function. The dwelling-cell imply a (standardized) pattern of behaviour which convey in use-areas. The particular arrangement of dwelling-cells leads to identifying dwelling prototypes (see Political Architectural Function).

Dwelling prototypes generally consist of one, two, three or four bedrooms, plus a larger room for dining-living, a bathroom and kitchen. A small backyard is very often integrated into the programmes

At the design stage is normally for the designer to think what is the 'best' orientation each dwelling-cell can have. For instance in Mexico City, having a temperate dry-climate with an temperature of 21°C, the following climatic and use-activity considerations are generally taken into account. Each dwelling cell, according to its behavioural function, may have an orientation priority. The best orientation for bedrooms is south and west, so that the heat accumulated during the day can be kept and maintain the room relatively warm during the night. If the living room is to be used much during the day, its best orientation is to the south, but it is equally good to have it to the west providing it is well ventilated. The dining room due to its short periods of use during the day may be equally satisfactory facing east, south, west or even north. The kitchen and bathroom are normally thought to be best located at the north.of the house or flat but they can well face east. The access to the dwelling and its location in the block will determine the orientation priorities of each dwelling cell.

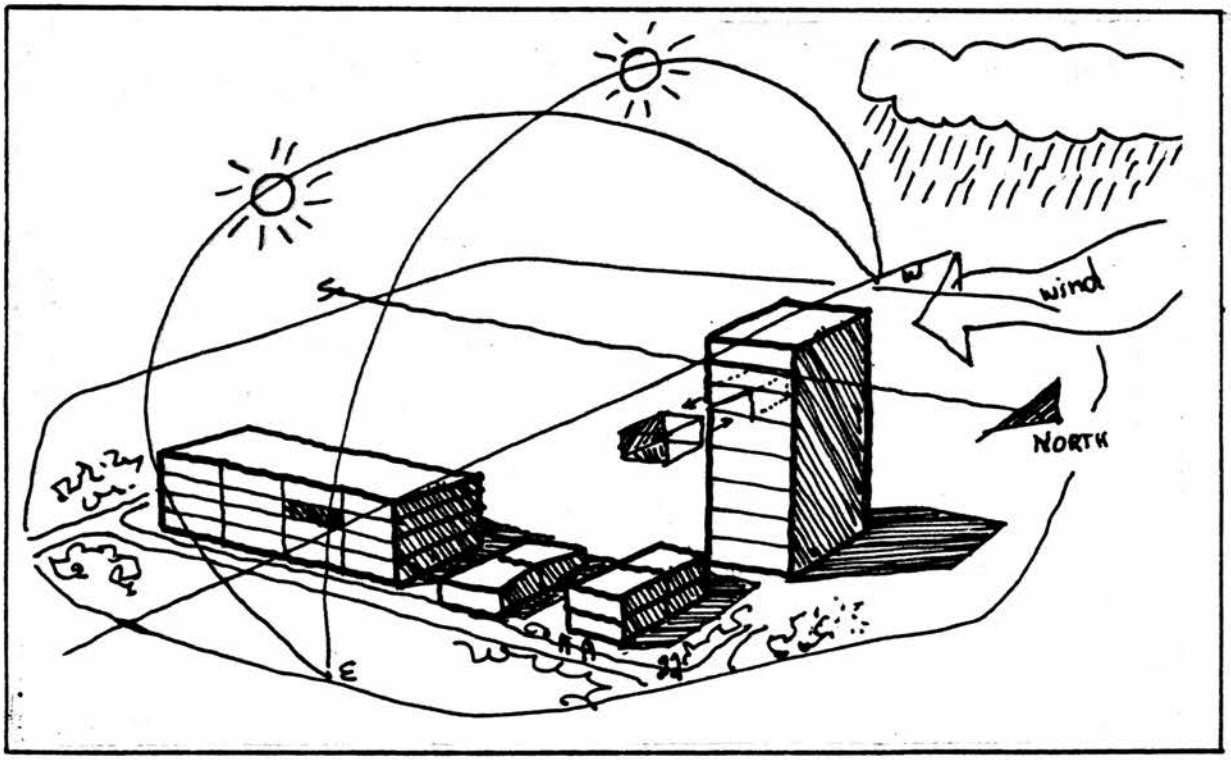



Fig. 6.17 Sketch showing climatic factors.

Climatic modification is mainly done through manipulating the orientation of buildings and dwelling-cells. Materials and elements seem to be adequate. Climatic control in buildings in Mexico City is easy to achieve due to the existing conditions. Micro-climatic effects within modern housing schemes seems to be without importance in this case.

Elsewhere, in extreme climatic conditions where it is hot or there is a long and heavy rainy season the climatic modification within modern buildings is inappropriate. This is so because mechanical climate control or special building materials cannot be considered for technological or economic reasons, or else because traditional materials and natural systems of climate control are not integrated into the housing process.

Thus two opposite results seem to appear in the climatic modification in modern housing:

1) Climate modified by the building is 'well adapted' and with good levels of comfort.

2) Climate modification is deficient (due to centralized design and ignorance of local conditions and knowledge on traditional climate control systems. Or materials and building types have not been thought to be appropriate for the geographic-climatic conditions). This includes both internal and external microclimate.

In both cases dwellers must adapt to the climatic conditions rendered by the building, and rarely and with difficulty can they change the original design, Particularly in the latter case where this may be badly needed.

## 6.6 SUMMARY AND CONCLUSION

This chapter deals with the Government Housing process that takes place especially in Mexico City.

In order to reach general conclusions we attempted to describe the structure of five main architectural functions; the Symbolic, the Climatic, the Political, the Economic and the Behavioural one. These structured processes are mediated by the building object and/or in the production processes. Processes and product mediate the connectivity of both, 'elements' within each architectural function and between the various (levels of the SCAPEB) architectural functions. Further conclusions will be drawn after listing the main features of those architectural functions which have been analysed.

The Political and Behavioural Architectural Functions.

These functions interact closely with the Economic and Symbolic ones. Urban agglomeration and household (Dwelling-cells and clusters of flats and buildings) levels of spatial organization are affected by the political architectural function, which in addition influence the level of organization of the housing process in the following aspects:

1) The rationalisation of the operations of the process, and subsequent standardisation of housing units within large scale production and housing schemes, are the result of centralized hierarchic control embodied in housing institutions and construction firms. In addition rationali-

sation in housing production, distribution and exchange is a function of maximization of profits. Thus the State represents and supports the contention for profit by the interest of the various fractions of capital (e.g. industrial financial, landed and property capital) articulated to the housing process.

The organization of the housing process implies rationalization of task, activities, regulations, building operations and systems etc., and it does attempt to optimize the resources and support the hierarchic and centralized structure of decisions and systems and processes envolved (e.g. financing, design, management, maintenance and construction). Professionals play a dominant role in the housing process. The user is brought in late in the process, thus planners and architects have the responsibility for the interpretation of future users needs, which are expressed in dwelling prototypes directed to serve anonymous client (socio-economic) groups. Regulations play an almost equally important role than the designers. Two sub-systems exist in the promotion of housing; internal and external promotions. In the internally promoted housing the institutions control the housing process through direct management except in construction that is done by sub-contracting developers. In the externally promoted housing the Government attempts to control some aspects of the process through regulations, nevertheless private firms exert their influence in the rising cost of housing, materials and speculation of both land and buildings.

2) Urban level of agglomeration. The spatial configuration of housing contains a mixture of buildings and open spaces organized in clusters

and/or neighbourhoods. Buildings are low-rise semi-detached or disperse and high-rise compact blocks of flats or towers. Both have minimum standards. The design of housing schemes follows two patterns of spatial distribution namely the influence from modern architectural trends and evolved traditional patterns. Concepts from both are found in single projects, especially at the urban level, nevertheless the modern movements in architecture and planning exert a definite influence on State housing, thus design is totally controlled by professionals, though after considering regulations and socio-economic constraints.

3. Dwelling level of agglomeration. Two distinct housing programmes exist in the Mexican housing institutions: (a) housing of social interest mainly to satisfy housing needs of the middle classes, and (b) housing of popular interest is a programme designed to provide housing for the lower-classes. Both housing programmes are differentiated in terms of standards and systems of financing. Housing prototypes of both programmes are based or related to patterns of household structure - ability to pay groups. Six housing/dwelling prototypes are identifiable: (1) single house with two, three or four bedrooms, living-dining plus core services (kitchen and bathroom) and yard; (2) duplex/triplex dwellings (two or three dwellings in the same plot; (3) flats of one, two, three or four bedrooms, living-dining plus core services (and yard); (4) the basic housing with living-dining space, one bedroom, core services and yard; (5) a model house containing a multi-purpose room, core services and a yard. This prototype has three variations: the attic, attic-shop house and the workshop house; (6) the cardboard house, a provisional one-room structure.

This situation unfolds in hand with the substitution of new materials and the introduction of new technological methods. Nevertheless concerning the mechanization of operations, this is not easy to introduce, except in few building operations or in few projects which are also determined by the size of the housing scheme. Here the pace of production is also constrained by seasonal changes.

A wide range of levels of building operations are employed in which simple and high skilled knowledge is applied. Ordinary (building) skills are acquired in apprenticeship and higher skills and knowledge on building in centres of training and education. They are applied at all levels and stages of the housing process. At higher and lower levels of production the most important feature of labour relations is wages. The division of labour is task oriented and relations of authority are defined within a hierarchic structure. The above description indicates that the control over the production process is definite and so it shows that the political architectural function's influence upon the economic one is one of domination. Nevertheless the limitations of resources translated into minimum spaces in addition to the exchange and profit oriented productions suggest that the Economic architectural function determines and defines the interaction between the rest of the SCAPEB Architectural functions. (See chapter 7).

The Symbolic Architectural Function. Three distinct ideologies can be identified in the Government housing process. Two of those are shared by professionals, politicians and architects, which are expressed in the housing product and the third body of ideas about housing is that of

the users. The Government ideology shared by professionals and politicians embody the concepts/beliefs in progress, efficiency, large-scale, low-cost, contemporary. These are expressed in the various dimensions of the process and are interrelated with planning and architectural ideologies. Planning advocates the central concept of 'Public interest' while architecture is concerned with spreading concepts which manifest in built form and supposed to meet general acceptance. Organizational principles of built form and spatial distribution respond to designers architectural ideology and represent the 'modern trends' in architectural styles. Planners and architects impose the prevalent mode of living representative of and integrated with the architectural culture. This is 'standardised'; the prototyps building programmes are modified and adapted to existing economic constraints, which usually take the form of minimum dwelling types.

Housing prototypes becomes symbols of modes of consumption and ways of life; at the level of the overall housing scheme often symbolises the power of the beaurocracy, at the household level the anonimity of users' dwellings is characteristic of this type of mass housing. Housing is impersonal and anonymous. Dwellers are alienated by housing which is externally charged with alien symbols. Alienation is emphazised by the non-participation of dwellers on the production process. This symbolic architectural function shows a close interaction with the political and behavioural architectural functions, though the symbolic function is to some extent subordinated to the political and economic architectural functions.

The Climatic and Behavioural Architectural Functions. The control of environmental elements is exerted through the design of the building and its elements (e.g. windows, screens, sunbreakers or through landscaping, distance between buildings etc. at the microclimatic level), the implied arrangement of dwelling cells and the use of materials.

The spatial organization of dwelling cells, each one with its own orientation preferences, within the given dwelling orientation, becomes a basic tool of designers to influence the climatic architectural function. Two opposite results are found in the climatic modification in modern housing: 1) Climate modified by the building is 'well adapted' and with good level of comfort. 2) Climate modification is deficient (due to centralized design and ignorance of local conditions and knowledge on traditional climate control systems, or materials and building types have not been thought to be appropriate for the geographic-climatic conditions). This include both internal climate and external microclimate.

In both extreme cases dwellers must be adapted to the climatic conditions rendered by the building. And rarely and with difficulty they can change the original design.

This indicates that the climatic architectural function is subordinated to the political and economic one. What is important to emphazise is that out of the two effects of climatic modification; in the first case the behavioural function is syncronized with the climatic one. That is the use/activities in its dwelling cell function adequately according to the best orientation chosen for them, and in the second the behaviou-

ral function is to some extent modified by the climatic one. This means that use/activities in its dwelling cell do not function 'ideally', the climatic performance is low. In both cases because designers control design, also through regulations, then we identified the behavioural and climatic functions as being subordinated to the political architectural function and determined by the economic one.

Perhaps one of the most interesting paradoxes occurring in the housing estates is that in spite of being strongly influenced by modern architectural trends, the essence of architecture is restricted and diminished as soon as architects' professional status is introduced into programmes. The ideological role of architecture is then definitely minimized. Even in the externally promoted housing, the architect's dilema is to work for profit or for architecture. In the latter case architects are more concerned to impress their fellow architects than to satisfy the users of their buildings.

The user is brought late in the production process, then cynically, it is given to households to believe that they have certain power to decide over the type of housing with its different levels of desirability. This is when the number of rooms and its dimensions varies directly proportional to the income level of the worker. It is obvious that the households' choice is determined by their income level. (G. Garza and M. Schteingart, 1978, p. 198).

A distinction is made between housing in the popular interest and housing in the social interest. The former housing programme is characterised by lower standards and specially because the dwelling is composed of mainly one multifunctional room. As a result the family have no possi-

bilities either for differentiating their space-activities, or for increasing reasonable spatial boundaries as family growth requires. That is even having introduced a house prototype which can grow, on the basic of minimum space, the dwelling is still overcrowded. One room dwelling-cells (e.g. living and sleeping, sometimes working). The family often grows faster than the already unsuitable spatial provision. Housing programmes of social interest, addressed to satisfy middle income groups, imply that dwellings with more than two or three rooms are likely to foster the family members sociability or at least to differentiate basic space-activities by means of occupying more rooms but with fixed, therefore, unchangeable spatial boundaries. In addition the distribution/consumption of these dwellings are not necessarily based on the family members needs but they are distributed according to the household income level. Rarely or in no situations is there a match of the spatial needs and priorities of the dwellers with their own dwellings.

One room housing prototypes are based on studies of certain types of vecindades. This cannot be regarded as a definite solution or adequate one in spite of the number of variations it has, since it does not include all the categories of housing tenure which exist and have affected the dwellings form.*

Nevertheless the concept of the house that grows is quite valuable, in spite of the restrictions it has.

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* See Chapter 5. Property relations strongly influenced the dwelling form in purpose-built vecindades.

The boundaries of dwellings are strictly defined. Private and public domains are well demarcated especially in blocks of flats. As a result nuclear families tend to be isolated. The standardisation of ways of life are imposed over individual users needs and priorities. Household transformation occurs within the rigidity of fixed designed dwellings causing conflicts and the state of alienation. Thus the political architectural function exerts a domination upon the behavioural one. This influence and control over dwellers' behaviour, functionally speaking, is fostered by the economic, symbolic and climatic architectural functions of which main features are:

The Economic Architectural Function. Land, Capital (investment)Labour (manual and mental operations) Materials and Technological levels are the important input/elements of this mode of production. Land is generally owned by the Government. The housing product is public or private (or semi-private). Production is exchange oriented. New developments are characterized by the large investments put into the housing process; the result are large scale housing schemes, of which production process takes the following form:

Building processes and the gradual and constant transformation of the product are characterized by the rationalization of building operations and the complex coordination of assembling. This imply the use of often sophisticated management techniques to control productivity and the consequent rationalization of the ever increasing differentiation of building operations and also the specialization and division of labour.

Boundaries of dwellings are clearly drawn, a demarcation between public and private domains is strictly defined. This condition fosters the isolation of nuclear families at the social level and encourages private property at the institutional one and this indirectly helps to maintain and reproduce the capitalist system.*

The actors within the Government housing process serve the interest of the dominant class in power. That is the state is not at all a neutral organisation standing above society, adjudicating between rival interests. Housing institutions ultimately become an instrument of class rule to maintain the power. The production process and the symbolic images that housing renders are the product of a dominant ideology that justifies itself, exists and reproduces, in so far as it reinforces the social function that has produced the housing product or commodity to which it has given its form.

The concentration of capital in the housing institutions demand large and ever modernizing organisations emboying a hierarchic centralisation of decision making structures which in turn require to rationalize the processes involved especially in production.

The rationalisation of operations throughout the production process helps to control costs, performance and profitability. Production in

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* Bassett and Short (1980 p. 208) expressed this assertion: 'The survival of a capitalist system depends upon the reproduction of certain social relations (tenure forms and authority) just as much as the reproduction of labour power and means of production'. Whereabout housing production and design play an important role.

the externally promoted housing is more obviously profit oriented. The cost of housing, often artificially raised, is greatly increased (13% higher than housing internally promoted), by the participation of private firms. Thus the State increases the links with the construction industry through supporting the interest of the various fractions of capital; namely the industrial, financial, landed and property capital which are articulated to the housing processes. These factors affect the quality of housing, the transformation of housing in the region and the ever decrease accessibility of the lower income groups to the housing market.*

The State plays an important role as a regulator of the housing distribution but not in production as a whole, since this is in general in the hands of the private sector. In addition the Mexican Government develop housing programmes which are directed to solve the housing problems of low-income groups but mainly of those who can afford it, they are a very small minority. These housing programmes benefit especially those involved in the entrepreneural activities of housing in both private and public sectors.**

6.7 The following tables refer to the Government Housing Process.

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* 65% of the mexican families have no access to the housing market neither to the public housing, because: firstly their income is below the minimum which is demanded by the housing institutions. Secondly, the supply of housing (public and private) will not cover the total demand. Thirdly the supply of housing addressed to low income groups is minimal. See G. Garza and Martha Schteingart (1978).

** These issues have been discussed by Gustavo Garza and Martha Schteingart (1978 p. 225). See also COPEVI, Vol. IV. El Capital en la Construccion de Vivienda.

| ELEMENTS | DESCRIPTION |
|---|---|
| SPACE | a) Interior spaces, both kinds are found: simple and complex, also uniform and irregular.<br>b) Exterior spaces, various kinds: regular and irregular; enclosed and semi-open; public, private and semi-private. |
| STRUCTURES | c) Dwelling units are semi-independent houses or flats:<br>i) Low-rise modern dispersed suburban or<br>ii) Medium/high-rise compact blocks.<br>d) One site assembled, partly pre-fabricated. Spaces and structures are inflexible and untransformable. |
| MATERIALS | e) Include a vast range of different materials and components produced by a wide variety of processes from traditional to highly developed prefabricated elements and parts. |
| GROUPINGS | f) Household Level. i) Low-rise; single dwelling unit, independent house and clusters of semi-independent dwelling units. Spatial distribution 'respond' to society household trends. ii) High-rise; dwelling units (flats) are monolitically structured in compact blocks.<br>g) Urban Agglomeration Level. i) Low-rise; modern dispersed suburban, following grid-iron patterns, often mixed with ii) medium/high-rise. Compact blocks design/planted upon large 'superblock housing units' with intended green and parking areas, as well as community facilities. |

Fig.6.18 Table; Spatial Elements and Configurations.

This and the following tables refer to the Government housing process. Reference is mainly made to Mexico and then to other Latin American countries. These tables represent a synthesis of the description and analysis of this housing process.

| ELEMENTS | DESCRIPTION |
|---|---|
| 1) ORGANIZATION OF THE PROCESS | It is characterized by:<br>a) The rationalisation of operations throughout the process: production (planning, design, construction and maintenance) distribution and exchange.<br>b) Rationalisation is a function of maximisation of profits that benefit the interest of the different fractions of capital envolved, namely industrial, financial, landed and property capital.<br>c) Large bureaucratic and centralised hierarchic structures of decision making are a consequence of capital accumulation in housing institutions which support the increasing link between public and private sectors.<br>d) Professionals play a dominant role in the housing process, users participation does not exist.<br>e) Design follows regulations dictated upon densities, land uses, layout types, construction systems, transportation etc. |
| 2) URBAN LEVEL OF AGGLOMERATION | f) Urban space is organized according to architecture-planning modern trends especially or evolved traditional urban patterns. The spatial configuration of housing contains a mixture of buildings and open spaces organized in clusters and/or neighbourhoods. |
| 3) DWELLING UNIT AND CLUSTERS LEVELS OF AGGLOMERATION | g) Space is organized by designers following stated rules. Dwelling unit spatial distribution is based on standards. These are a result of assumed society's household composition. Standardisation of ways of life are imposed over individual users needs and priorities.<br>h) Clusters level of spatial organization can be: a) Low-rise; high and low density (i.e. dispersed suburban) and b) High-rise housing which is monolitically structured in compact blocks. These contain six housing/dwelling prototypes: 1) Single houses, 2) duplex/ triplex, 3) flats (1,2 and 3 containing 2-4 bedrooms, living-dining room, plus core services and yard) 4) basic one/two multi-purpose room with 3 variations. Clusters and dwelling prototypes imply an arrangement that firstly would maximise space-use and minimum cost, and secondly that social 'contact' among neighbours should be likely to occur. |

Fig 6.19 Table; The Political Architectural Function (interacting with the Economic and Behavioural ones).

| ELEMENTS | DESCRIPTION |
|---|---|
| OPERATIONAL FACTORS | |
| Technical knowledge, | It has degrees of complexity, skills and highly skilled knowledge is acquire in apprenticership (for workers) or in centres of higher education. |
| Object of labour, | It takes the form of industrialized materials simply or complexly transformed. Various types of brick walls and prefabricated elements and parts assembled are the result. Land is located in the periphery and is relatively accessible. |
| Means of labour, | A range of means of labour are employed; from simple to complex tools and machinery. It uses imitative, high level and often capital intensive technology. |
| Sets of operations, | Building operations are both simple and complex, unitary but no necessarily complementary; tasks are distributed. Site organization requires special attention. Building operations are carried out individually and especially by teams in both simple and complex task, extended-co-ordination, cooperation/organisation, within and without the site. Sets of building operations (work chains) are rationalised. Process identifyable into planning, design, management, construction and maintenance or repairs. |
| WORK ORGANIZATION | |
| Organizing principle, | Large centralised offices and building teams operate. Modern management techniques are employed and highly organised site and work is needed. Production is planned. 'Specification Standards' operate. |
| Production unit, | Large and medium construction firms and teams of builders participate; contracted or sub-contracted managed directly by the Government or by private firms. Wages are the dominant form of labour relations. |
| Division of labour, | This is mainly between mental and manual operations (resembling class structure). Mainly men undertake tasks especially in manual operations. Tasks are define distributed strictly and relations of authority specified hierarchically. |
| Forms of cooperation | Cooperation as such do not exist, but simple and complex organization and individual and team labour is excercised. |
| Property Relations and authority, | Land is originally owned by the Government. Means of production are under Government control. Hierarchic authority is within highly centralised institutions and in a lesser extent in construction firms. Control is exerted throughout the process, at various degrees. Ownership of the housing product is either public or private (or semi-private) Production is exchange-value oriented) |

Fig.6.20 Table; The Economic Function (interacting with Political and Behavioural Functions of architecture).

| ELEMENTS | DESCRIPTION |
|---|---|
| CLIMATIC AND BEHAVIOURAL FUNCTIONS. | Two opposite results seem to appear in the climatic modification;<br>1) Climate modified by the building is well adapted and with good level of comfort.<br>2) Climate modification is deficient (due to centralised design and ignorance, of local conditions and knowledge on traditional climate control systems, or materials and building types have not been though to be appropriate for the geographic-climatic conditions. Often developers change specifications to control target costs and so affecting climate performance. This include both internal climate and external microclimate.<br>In both extreme cases dwellers must be adapted to the climatic conditions render by the building. And rarely and with difficulty they can change the original design. |
| SYMBOLIC AND BEHAVIOURAL ARCHITECTURAL FUNCTIONS | Organisational principles of built form and spatial distribution respond to designers architectural ideology and represent the 'modern trends' in architectural styles. The recent ideology of the Government embodies progress, efficiency, large-scale, low-cost, contemporary.<br><br>Government designers (planners/architects) impose the prevalent mode of living representative of and integrated to the architectural culture. This is 'standardise', the prototype building programs are modified and adapted to existing economic constraints, which usually take the form of minimum dwelling types Housing is impersonal and anonymous. Dwellers are alienated by housing which is externally charged by alien symbols. Alienation is emphasized by the non-participation of dwellers on the production processes. |

Fig 6.21 Table; The Climatic and Symbolic Architectural Functions, (interacting with Political and Behavioural functions of Architecture)

CHAPTER 7

# THE TRANSFORMATION OF HOUSING PROCESSES. COUNTERACTIONS AND CONCURRENCES AMONG THE [SCAPEB] ARCHITECTURAL FUNCTIONS. SHIFTS AND RESOLUTIONS IN THE HIERARCHY OF THE ARCHITECTURAL FUNCTIONS.

## 7.1 INTRODUCTION

This chapter and the following one (8) deal with transformations of housing processes. The analysis of transformations occurring within and between housing processes or, being the same, within and between their architectural functions, implies questioning not only how but also why changes happen in the artificial environment. If the performance of an architectural function changes in time and space, it is because a transformation occurs either in the structure of the same architectural function or within another one, or the causes might be found completely outside of the housing process. (See Chapter 8).

We assume that it is possible to characterize any society in terms of the transformation of housing processes. Also to understand the transformations of housing processes seems to be crucial to the builder's praxis* and dweller's satisfaction as much as to the architect's creativity. Therefore an awareness of such changes is essential to the evolution of humane housing processes (see Chapter 9).

Transformations of housing processes and their corresponding architectural functions take place in three distinct dimensions: the historical, the temporal and the territorial. The general

*For the builders are directly engaged in the changes occurring in building construction.

characteristics of these are as follows:

The historical transformations of the [SCAPEB] architectural functions evolve over a long period of time. Each transformation might originate within or without both the housing process and the territory. Therefore they can also be pursued by cross cultural studies. Historical transformations, in this thesis, are mainly traced by comparing 'primitive' with 'modern' societies*.

The temporal transformations of the functions take place within the same housing process. Here two different kinds of temporal transformations are identifiable: transformations occurring along the process of production, and transformations of the spatial organisation and built form occurring throughout the period of life of the building. Both kinds of change are interconnected and mutually affect one another. (Descriptions of them have been given in Chapters 3, 5, 6 and 8).

The territorial transformations of the architectural functions refer to changes of the production process and/or spatial organisation and built form occurring between two (sets of) housing processes taking place within the same territory, urban area or region. It is an almost simultaneous relationship between two housing processes. Territorial transformations of housing processes are mainly manifested in mosaic-like urban configurations (see Chapters 4 and 8).

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*or 'primitive' architectural processes, which evolve under a 'primitive' communist mode of production, with housing processes that take place in a territory where the capitalist mode of production is dominant. See Chapters 2, 4, 5, 6 and 8 especially.

Two dimensions of transformation may appear together or actually overlap. For instance the change of the chief architectural function, from the symbolic (of the 'primitive' architectural process) to the economic and political ones (of the popular and Government housing processes), is a historical as well as a territorial transformation (see below, especially the conclusion).

The transmutations observed from housing processes of a primitive society to those of a modern one are characterized by the changing values that architectural functions render. The primary transformation traced between the housing processes investigated (primitive, Government and the popular housing) is a shift in the emphasis in the performance of certain architectural functions. This chapter discusses this phenomenon.

The specificity of the architectural functions determines the nature of any housing process. If architectural functions vary in incidence over space, the housing processes appear diversified and a series of variations in various levels may be identified in any housing process prototype. Nevertheless there is a dominant performance of some or one architectural function in any set of housing processes.

The structure of housing processes and their spatial configurations can be identified and defined for each society or territory according to the conditions in that period of time of the dominant architectural function. This dominant architectural function characterizes the housing process and interpenetrates the housing mode of production. This in turn defines the structuring of the political, symbolic, economic and behavioural functions. Reciprocally, within

the mode of production, a relatively autonomous architectural function conditions the specificity of the dominant architectural function. Thus it is important to define and describe, though briefly, the characteristics that make an architectural function dominant; and also the features of any counteracting conditioning functions that stress the domination of the other.

## 7.2 THE SYNCHRONY OF THE ARCHITECTURAL FUNCTIONS AT THE 'PRIMITIVE' ARCHITECTURAL PROCESS

In the 'primitive' architectural process the symbolic function is dominant since it shows its semiological properties in every morphological level. At the same time several levels of the economic function condition this symbolic dominance; that is to say the low level of development of the operational factors (techniques, forces of production), the availability of free resources and the work organization vested in kinship relations foster the full realization of the symbolism in spatial distribution and built form.

The dominance of the symbolic function, as is the case with the primitive architectural process, implies relative* integration with the economic function in this particular mode of production. This interrelation becomes a condition of the process of production. The political and symbolic functions are consequently and by necessity introduced into the economic function itself. Furthermore they are

*Each function denotes its autonomy but it also is necessarily interdependent. The tensions, variances and counteractions among the 'SCAPEB' architectural functions result in the specific role played (whether dominant, conditioning or subordinated) by each one of them. Such interplay defines the particular synchronization among or correspondences between the functions of architecture. See below and conclusion of this chapter.

clearly manifested in built form and spatial distribution, in the architecture of the compound. On the one hand the forces of production, which are characterized by a low level of development, overlap with the relations of production through the multifunctional role of kinship. On the other hand the symbolic function is manifested through these social structures at every level of architecture. (See Section 3.4). This kind of functional integration consequently results in the correspondences between the political (and partly the economic) and the behavioural functions. The correspondences between both functions are identified at two instances of the spatial arrangement; the transitional and the transformational. In the former, the relationship is of a static nature and occurs at the conjunction of social and spatial structures. The composition of the family has, at any point in time, a spatial counterpart. So the family and each member of it have their spatial needs fulfilled. The transformational correspondence (between the political and behavioural functions) takes a dynamic form and occurs at the concurrent change of social and physical structures; changes through time of the size and the spatial organisation of the compound reflect changes in the family structure (see Sections 3.2 and 3.6).

This type of correspondence of architectural functions enhances the behavioural and the symbolic values* of the primitive architecture, in which case the aesthetic function encourages their reproduction. Architecture works not only in terms of fostering an aesthetic experience but also it generates aesthetic values and attitudes of both users and producers. In the 'primitive' mode of production,

*For the definition of the behavioural, symbolic and aesthetic values see Chapter 1; Sections 1.8, 1.3 and 1.5 respectively.

users and producers are the same people. Thus as part of the same phenomenon the process of perception of space becomes a crucial aspect of the aesthetic interaction as much as its symbolic reproduction in their architecture. The dweller-builder is thus an active force indispensable to the genesis of meaning as well as to its material production. To such extent that the built environment is pregnant with meaning at every level, the symbolic architectural function is dominant. The economic architectural function counterbalances its realization, and thus the economic function plays a conditioning role (see Sections 3.5 and 3.6).

## 7.3 THE LATENCY AND DETERMINATION OF THE [SCAPEB] ARCHITECTURAL FUNCTIONS IN THE POPULAR HOUSING PROCESS

In the popular housing process, the elements of the economic processes are the most important for its overall performance. The economic function is determined, partly, by factors operating outside the housing process and which affect society at large (see Sections 4.2, 4.5 and Chapter 8). Those factors that condition the economy of the marginal groups evolved over a relatively long period of time and are expressed through the dominant pattern of socio-economic relations* within the national territory. Hence the economic function exerts its influence upon the whole set of architectural functions.

At the household level, the dwellers have control over the production of the house. Their decisions are determined by the conditions of social, cultural and economic marginality. For instance to build

*Explicitly, the capitalist relations of production and the unequal distribution of the means of production. See Sections 4.2 and the following chapter (8).

one room may condition the behaviour of the dwellers. The room's door might be enough to function as entrance as well as window. If an extra door or window is thought to be necessary, but means extra cost in the initial investment, and money for it is not at hand, either preparations are made in the wall to fix it later or it will be made long after the room has been built and used. Meanwhile certain alienation might occur; dwellers might get used to performing a variety of activities in one room under conditions of darkness and overcrowding. Otherwise improvements will be made as soon as resources are available. Resources are acquired step by step, and this necessarily conditions the dwellers' design as much as the manner they choose to solve any structural/spatial problem. The solution in addition is influenced by their perception of their own way of life and by their aspirations. Therefore, the correspondence* between the political and behavioural architectural functions is subjected to cultural and economic constraints (see below).

The fact of having certain 'control' over the resources does not mean to improve the behavioural value of the spatial structure at its best. This requires not simply an awareness of the needs by the dwellers themselves and a yardstick of priorities in order to meet them, for these are already determined by their overall marginal existence, but a change to overcome their economy of subsistence and dependence is necessary. The type of control the dweller exerts upon the housing process is conditioning the performance of the economic architectural function, which plays a central role in this housing

*To understand clearly this relationship, opposed or different conditions might be associated with this. See for instance the correspondence between the same political and behavioural functions at their primitive counterpart which is illustrated in the previous section, also in 3.2 and 3.6. Furthermore, account of this relationship has been the basis to analyse the temporal transformation of space at any housing process. See Chapter 8.

process.

The following features emphasize the crucial role played by the economic process: (a) modes of appropriation, mainly private property and a corresponding distinction between tenants, landlords and owner-occupier; (b) the legalization of land tenure and speculation of land and buildings and the consequent increase ~~on~~ rents; (c) the rise in the cost of materials, and building operations (wages); (d) the very low and discontinuous income of households and (e) the emergence of reciprocity networks which diffuse the solidarity among dwellers within the same settlement. All these factors are part of the economic function which is manifested in the shifts of quality of housing types within the same region and in the slow process of (temporal) transformation; from shacks (through vecindades in the cases of dwellers changing residence) to housing consolidation (see Section 5.2).

The conditioning role played by the political architectural function stresses and counterbalances the dominant role played by the economic one. All the other architectural functions are subordinated mainly to the economic one.

## 7.4 LATENCY AND COUNTERACTION OF THE [SCAPEB] ARCHITECTURAL FUNCTIONS AT THE GOVERNMENT HOUSING PROCESS

Within the Government housing process the political architectural function is dominant. In this case the economic architectural function plays a conditioning role. In this housing process a large hierarchic and centralized organization exerts its influence on, and controls, planning, design and construction, and often too, the maintenance of

housing. The domination of the political function is reflected in the mode of production of housing as well as with spatial distribution and built form. The spatial configuration reflects the process which has given its form.

The political architectural function takes effect at the following levels: the organization of the process within the internal structure of (hierarchic and highly centralized) institutions and production units, and around the rationalization of building (and other) operations and the product. To separate functions and establish distinct departments is characteristic of large organizations. Within these, specialized professionals operate. Subsequently the differentiation of task oriented and relationship oriented patterns in planning and production stages appear.

Profit oriented production definitely influences the rationalization of planning and production processes. It encourages the speeding up of the pace of construction, through standardization and by introducing labour saving systems (see Section 6.3). The economic function to a certain extent stresses the function of control. The structures of decisions and of 'agents' of control directly affect the production processes and the consequent standardization of the housing product (see Figure 6.11). Such influences appear at various levels of design: urban, high- and low-rise buildings and dwelling arrangements. Controls are executed through decision makers, designers and by the medium of cultural codes (e.g. traditional spatial patterns) and regulations about densities, land uses, dwelling space, etc. These codes, regulations and designers' intentions affect other architectural functions (see the climatic

and symbolic functions, Sections 6.4 and 6.5 respectively). Thus the political function of architecture dominates this housing process and the other functions are subordinated to it. This is especially observed for the behavioural function. The spatial distribution of dwelling prototypes is based on minimum standards: minimum space and 'minimum costs'. Planners assume society's household composition. Private property is encouraged and the standardization of ways of life are imposed over individual needs and priorities. The participation of user in design generally does not exist. Alterations to dwellings are not only forbidden but often are also impossible. Therefore the behavioural function is totally subordinated to the architectural function of control, and both are conditioned by the economic one. This conditioning of the economic architectural function is exemplified by the following principal features: (a) the separation of designers/dwellers/builders and the emergence of conflicting interests; (b) the introduction of wage labour in production and the subsequent creation of exchange value; (c) the evolution and diversification of technological means; (d) the evolution of regulations upon construction and spatial and built form, which are devices of control of the housing process; and (e) the increasing constraints and speculation in both land and the buildings.

## 7.5 CONCLUSION

In this chapter it has been argued that any preponderant features of a given housing process (popular, primitive or Government) bring to the foreground the performance of one or more architectural functions. By indicating the antinomy between the structures of two distinct

architectural functions, it has been possible to describe each housing process in terms of the domination/conditional relation of its chief architectural functions.

This means that some of the [SCAPEB] functions are more relevant in each case than others. There are priorities in every circumstance and a subordination of some functional considerations under others seems to be unavoidable. Certain architectural functions remain in the background playing a secondary role.

We can represent graphically the particular function that exerts its domination over the process and its counteracting conditioning function, in relation to the architectural functions which remain in the background, for each housing process investigated:

| FUNCTIONS / PROCESSES | S | C | A | P | E | B | · Mode of production and social formation |
|---|---|---|---|---|---|---|---|
| PRIMITIVE ARCHITECTURE | ○ | o | o | o | ◍ | o | PRIMITIVE COMMUNIST |
| POPULAR HOUSING | o | o | o | ◍ | ○ | o | MODERN CAPITALIST |
| GOVERNMENT HOUSING | o | o | o | ○ | ◍ | o | |

Figure 7.1 Functional Hierarchy. The functional domination (○) and conditioning (◍) in each prototypic housing process.

The chief transformation traced between these sets of housing processes is the shift in the character and structure of one architectural function in its leading state. In any society the structure of the housing process(es) and the spatial configurations can be characterized,

identified and to a certain extent evaluated by looking at the dominant architectural function at its particular momentum. This is particularly important in understanding the basic levels of transformation (see Chapter 8)*.

In the 'primitive' architectural process the symbolic function plays the chief role; in the popular housing process the economic processes dominate; and in the Government housing process the political function exerts a paramount influence. In these three housing process prototypes the dominant architectural function determines the housing mode of production. Thus the whole set of architectural functions is subordinated to the dominant one. Nevertheless the climatic, aesthetic** and behavioural functions appear in all housing processes in a lower rank, that is to say these functions are subordinated to the dominant and conditioning ones. Yet, the function of behaviour necessarily plays a central role in architecture, since all functions are conveyed in it. Consequently, the description of the transformations in the following chapter (8) concentrate upon the symbolic, political, economic and behavioural architectural functions.

Architecture is multifunctional. A particular set of architectural functions articulate and characterize each distinct housing process. Production and the building, together or on their own, contribute to the structure of each one of the functions. Each function has a value and individually or as a set they are socially evaluated. (See Section 1.9). Each function or each housing process

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* Yet to understand certain kinds of transformations within the process (particularly the temporal ones), variations, tensions, contradictions and balancing among the functions, the structure of every function must be considered in its analysis. This has been done for the case studies.

**According to Jan Mukarovsky (1978), the aesthetic function, even in (Art)-architecture, can never become dominant. See the following footnote.

might appear balanced or unbalanced. While some functions of architecture are conspicuous, others seem to be hidden or altogether absent. Such phenomena of counteractions and concurrences among the functions affect the semiotic language of the housing processes. A change in the structure of the dominant function, or a shift of the dominant function from one housing process to another, necessarily manifests itself in a shift in the total meaning of architecture*. These transformations can be denoted as being, simultaneously, historical as well as territorial (this is a change in the architectural function throughout urban/rural space). Such a shift is also manifested in the functions performed by social processes or social relations, or the role of social processes within the housing process (from primitive to modern society see Section 2.2 and Chapter 8); that is, along production stages as well as during the life of the house or building. Not only in the sense of social processes modifying/identifying the relationship among dwellers and between dwelling-cells, but also in the change of the overall activity performed within the building, which is revealed in the shifts or emergence of building types enclosing particular activities (for

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*Jan Mukarovsky (1978) lucidly described and discussed a similar kind of transformation but with reference to the aesthetic function in art. He attempted to demonstrate that modern art (including architecture) is based on dialectic contradictions (pp.129-149, written by 1935). He wrote a brilliant essay 'on the problem of functions in architecture' (pp. 237-250, written by 1936-37). Here, he identified few functions of architecture (as an object) and put emphasis on the various effects of the activity-function (behavioural) and the aesthetic one on society and man. Mukarovsky described the oscillations and transformations the aesthetic function can go through. When its exclusion is proclaimed, it can transform into its direct opposite. For instance, he observed that 'the maximal denial of the aesthetic function in functional architecture becomes a means of aesthetic effect (maximal functionality equals maximum aesthetic value)'.

J. Mukarovsky (1978) relates architecture (in the sphere of art) to the perceiver and to society. He does not consider the production of it.

instance religious, commercial, industrial buildings, etc. - see Mukarovsky 1978, p. 241); in which case, architecture is related to man in his entirety; it is potentially related to all man's needs and aims and it appeals ...

> "... to all the components of his existence, from his general, common anthropological basis to his social and unique determination." (J. Mukarovsky, p. 243).

Therefore, the importance of understanding, analysing and intervening in the processes of transformation of the built environment increases.

While in the 'primitive' architectural process all functions are potentially omnipresent, in the popular and Government housing processes several architectural functions appear to be suppressed. (See Chapters 5, 6 and 8). Nevertheless, however low might be the level of performance of any function, such as the behavioural, climatic, aesthetic and symbolic ones in the popular housing process, any housing process is capable of rendering several functions simultaneously. Some architectural functions may outweigh, balance or oppose others, therefore altering their structure and norms in the course of time and throughout space. In such transformations, the functions which play the dominant role particularise the housing process. These transformations seem to be determined by the housing modes of production involved. External socio-economic factors also influence changes in housing processes, thus the description of the housing transformations must take into account the nature of the shift of the dominant function as well as the changes in the mode of production of housing within the social relations of production of the territory. This theme is dealt with in the following chapter (8).

CHAPTER 8

# THE TRANSFORMATION OF HOUSING PROCESSES II. CHANGES TRACED FROM 'PRIMITIVE' TO MODERN SOCIETIES AT THE STRUCTURE OF THE BEHAVIOURAL, ECONOMIC, POLITICAL AND SYMBOLIC ARCHITECTURAL FUNCTIONS

## 8.1 INTRODUCTION

This chapter describes the various kinds of transformationsthat occur within and between the three prototypical housing processes which have been investigated: the 'primitive', the popular and the Government housing processes (see Chapters 3, 5 and 6 respectively). For each of the descriptive models which have been studied, an attempt was made to understand the relative autonomy of the inter-relationship (see case studies) and the relative importance of each function's performance (see Chapters 3, 5, 6 and especially the previous one, 7).

Each one of the 'SCAPEB' functions of architecture, namely the Symbolic, Climatic, Aesthetic, Political, Economic and Behavioural is obviously different, and the nature of each as well as the forces affecting each one also differ. For instance the economic function is affected by technological developments as well as by modes of appropriation, prices and wage increases. The climatic function is affected by the physical variables of climate, e.g. wind, sun, radiation, etc. and so forth. Each function acquires its particular value and characteristics in its own context: for each architectural process in particular or for a set of prototypic housing processes in general. For instance the 'primitive' architectural process is characterized by the low development of the forces of production

in general and the use of mud wall-making techniques in particular (see Section 3.5). In a similar way to that by which we evaluate the performance of the whole we are able to judge the performance of the parts, and how and why the parts are transformed to affect the transformation of the housing process all together.

The architectural functions have multiple levels, and transformations are observable from a particular level of the 'primitive' architectural process to its nearest equivalent in the other two housing process prototypes belonging to 'modern' societies. In order to explain those transformations, basic levels of four architectural functions have been identified. The four architectural functions considered are the Symbolic, the Political, the Economic and the Behavioural. They have been selected because of their important position in the housing process in relation to both the mode of production and the changes of the dominant role (see Chapter 7) of one of them at each housing process prototype.

The description of the transformation of the housing processes traced from a 'primitive' one to a popular and Government housing process will be presented, taking into account the various dimensions of change: the temporal (within the housing process), the territorial (between two sets of housing processes), and historical (transformations occurring in a long period of time and/or traced by comparing two distinct cultures or social formations).

The transformations taking place in housing processes of a 'modern' society correspond at certain levels of the various architectural functions with the basic functional levels of the 'primitive'

architectural process. The features of the changes occurring in the construction process as well as in the dwelling space of both the popular and the Government housing processes will be discussed with reference to the factors affecting such temporal transformations. Additionally, the changes of the economic and political architectural functions within the territory, which in turn contribute to the evolution of the language of housing processes (the symbolic function) represented over territory (within and between human settlements), will be explained. Although apparently the direct agents affecting changes are within the mode of production of housing and important modifying factors exist outside it, historical changes inherent in socio-economic processes (mainly the functions of kinship relations) play a very important role. They not only contribute to the differentiation of housing patterns, but also it is obvious, when we compare antagonistic housing processes, that such changes in the social structures influence production patterns and can be traced in the transformation of the organization of space.

The changes identified as occurring during the transformation from a 'primitive' society, within which the mode of production has been characterized as 'primitive communist' (see Section 2.1), to a 'modern' one, where the capitalist mode of production dominates (see Section 4.2), do not necessarily follow a chronological order. Nevertheless it is assumed that the transformations of housing processes are as they would be if they had taken place in such an order. Otherwise, the correlation of transformations between both types of society or sets of housing processes stands purely on the ground of a cross-cultural analysis (from West-Central Africa to

Latin America, Mexico). This may appear here as featuring a sort of displaced continuity. Particularly for the former assumption, the transformation that follows a chronological order can be traced in some African countries where 'primitive' societies are undergoing change. And where cultural, political, economic, social and technological factors from both societies' dimensions (the evolution of the 'primitive' and the influence of modernization and capitalism) effect the variety of housing processes and the overall configuration of settlements upon their territory*.

## 8.2 BASIC LEVELS OF TRANSFORMATION OF FOUR FUNCTIONS OF THE 'PRIMITIVE' ARCHITECTURAL PROCESS

It was indicated, in Chapter 3, that the 'primitive' architectural process is characterized by the unity and balance that exists within the subtle interplay of society, nature and building. Here the built environment responds to a delicate articulation of the architectural functions in which the symbolic function plays a dominant role (see Chapter 3 and 7 especially). The architectural complex and each of its blended parts seem to be ecologically balanced. Inherently in architectural phenomena, internal variances, tensions and dialectically opposed (structural-functional) reactions are continuously dissolved into distinct correspondences of functions (see (2) below and Sections 7.2 and 3.6). To the semiological expressions (based on strong beliefs, shared by all), found at every level of the architectural and settlement configuration, the economic function is set against it to the extent of

*For the 'primitive' housing process transformed into urban housing patterns in some African countries see Friedrich W. Schwerdtfeger (1975). 'Comparative study of conventional urban houses in three climatic regions in Africa'. Architecture and Town Planning.

contributing to enhance the symbolic function and enrich architecture as a whole. This is made possible by means of rudimentary techniques, through skillful operations and following a natural order in their modes of appropriation. Consequently the transformation of nature into the built environment suggests a true extension of the landscape which is manifested in its visual and structural continuity. Similarly, it shows an exceptional, dignified organisation of space.

It was also shown, in Chapters 2, 3 and 7, that the structure and articulation of the 'SCAPEB' architectural functions within the architectural processes of the 'primitive' societies which were studied had to meet the following conditions:

1. Kinship plays a primary and multifunctional role. Kinship relations are neither an external form nor a residual content but, as asserted by Maurice Godelier:

   "... functions directly and internally as economic and political relations and so on, and therefore functions as a mode of expression of social life and a symbolic form of that life." (M. Godelier, 1972, p. 364).

   The conditioning role of the Economic function and the counteracting effect* of the Symbolic one do not contradict the dominant role of kinship but are expressed through it, to the extent that the family forms the work team. Thus in the 'primitive' mode of architectural production there is direct control of production by the users, because there is a direct appropriation of nature through the low development of techniques and the

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*This relationship is explained in Chapter 7.

plasticity of materials. In addition there exists a direct appropriation of the product: property is common and vested in the kinship structure. (Political and Economic architectural functions, see Sections 3.2, 3.5, 3.6 and 3.7).

2. The family controls design, production and annual repairs and in this way the family structure is expressed in spatial terms; to the extent that kinship and spatio-temporal transformations are co-terminous. (Political and Behavioural architectural functions' correspondences. See Sections 3.2, 3.6, 3.7 and 7.2).

3. The dominant role and complex structure of kinship relations in primitive societies are related to the general structure of the productive forces in construction (and in all economic activities) and their low level of development. These conditions demand cooperation from within the social structures due to the general homogeneity of the distribution of wealth. (Economic and Behavioural architectural functions. See Sections 3.5, 3.6 and 2.2).

4. The belief system is homogeneous in general and is projected in a dominating symbolic architectural function. The intended meaning thus fosters the people's cultural identity and continuity, in addition to giving homogeneity to territorial transformations of their built environment. (The Symbolic architectural function, see Sections 3.4, 3.6 and 3.7).

From these basic levels of transformation, changes in housing processes are identified as corresponding with similar architectural functions (namely the Behavioural, Economic, Political and Symbolic ones) of the popular and Government housing processes of a modern capitalist

society of the Third World. Within this type of society, the architectural functions have evolved to produce mainly two housing modes of production. These modes of production of housing are associated with two levels of the economy: the upper and the lower circuits (see Chapter 4, Section 4.5 especially).

## 8.3 TEMPORAL TRANSFORMATIONS OF HOUSING PROCESSES

The basic functional levels listed earlier as 1, 2 and 3, of the 'primitive' architectural process transform into the conditions of the housing processes in which the structuring of 'control' of the housing process and the economics of production affect directly the temporal transformations of housing. Furthermore, changes in the building process and conditions of dwelling space necessarily affect territorial transformations* of the housing morphology.

In a modern society, at both levels of the economy (the upper and lower circuits), the role of kinship in housing production is relegated to a secondary place. This condition has developed in a quite distinct manner for each mode of production and has a definite effect upon the pace of the production process and the feasibility of change of the dwelling space for each housing process:

### 8.3.1 Forms of the Temporal Transformation of Housing Processes, Upper Circuit

In the upper economic level, at the Government housing process (and

*These are changes between at least two (sets of) housing processes located within the same territory.

in general at any other one), kinship is removed from its political function in housing production and has been replaced by large, anonymous, hierarchic and centralised organizations. The political architectural function is embodied by professionals and also executed through regulations and codes (see Sections 6.2, 6.6 and 6.7).

The Government initially owns and consequently controls design, production and the housing product. These conditions influence both types of temporal transformations of the housing process: construction which has its own shortcomings (see below) and the organization of dwelling space which also has its own particular effects upon the behaviour of the users. Both kinds of temporal changes are characterized by the following:

8.3.1.1 Transformations within the same process of construction

The process of transformation within building construction is conditioned by the availability of or accessibility to resources (land in the first place, building materials, tools, energy and labour force), building methods, techniques of construction, etc., and how these are articulated in the mode of production. This, to some extent, is a function of the organization of production (design, planning, construction), distribution and exchange.

Gradual (temporal) transformations occurring within the building process follow the pace that construction itself imposes, where site organization plays a very important role. Yet, shortcomings are unavoidable, such as delays in the delivery of materials, seasonal

changes of weather, accidents and often the absence of workers, etc. Improvements in building techniques and methods; modernization of certain processes (e.g. lifting), as well as the introduction of building systems and the standardization of parts, have influenced the pace of production of building units. In any case, a speeding up of the construction process may be obtained by improved efficiency by all the participants. Other than this, a faster process may only be, or have been, achieved at the risk of (further) reduced environmental and design standards. The production cycle has been relatively shortened* but with high production and assembly costs. This also encourages strict discrimination of highly skilled labour in particular and of labour power in general. Above all, the rationalization of operations throughout the housing process at all levels and fields (design, planning, management, financing, production, distribution, exchange, maintenance) is a function of maximization of profits that benefit the interest of the different fractions of capital involved, namely industrial, financial, land and property capital (see below & Section 8.6, Section 6.2; COPEVI, 1977, Vol. IV, and R. Burgess, 9/1977 and 1978/79).

8.3.1.2 Spatio-temporal transformations of dwellings

The inflexibility of the physical structures and spatial systems, and generally the rigidity of building elements, parts and materials (if compared with their counterparts which are used in the 'primitive'

*Industrialization of the building industry has been identified as an archaic type of industrialization if compared with other industries where the acceleration of production ever increases. Due to the shortcomings of the construction industry, and its inherent slow turnover of capital, it is likely to remain a backward industry. This is especially the case in a developing country. (See COPEVI, 1977, Vols. ii, iii and iv, and M. Castells, 1977).

architectural process), together with the economic constraints and those enforced by building regulations, give little room for changing the organization of space and its physical envelope. We can rather identify modifications to ways or types of furnishing and adaptation of the user's 'compromised needs' to the available space. Initially, at the design level, activities and use patterns have been incorporated into solution types *. These have evolved within the practices of architecture, and are intended to reflect the preferences of various social groups. Yet, each type of solution has little or no direct feedback from emerging new patterns of life which spring from an economy in transition. As a result the behavioural architectural function is generally ill-articulated in the Government housing process (see Section 6.2.3), or else certain advantages for the dweller might appear in middle and upper class housing (e.g. low-rise with 'flexible' living rooms) but here the behavioural value must be questioned. Other than professionally designed buildings, solutions adapted to the cultural requirements of dwellers should exist and must be encouraged (this issue is discussed in Chapter 9).

### 8.3.2 Forms of the Temporal Transformation of Popular Housing Processes

Except for the purpose-built vecindades, any popular housing process is characterized by the fact that the dwellers, in general, inhabit the site while transformations of the physical structures take place. Also the sequence of mutation and alteration of such structures from

*As dwelling-cells and dwelling types. See Chapter 6, Section 6.2: the dwelling and clusters level of agglomeration and the climatic architectural functions; also 6. and 6.

shacks to a more consistent building (adobe or brick and concrete made) is very slow (from 5 to 20 years). These conditions respond to the performance of the economic and political(architectural) functions (domination/conditioning respectively), which have the following characteristics.

Unlike the 'primitive' architectural process, the role of kinship here is not dominant but it functions at equal levels with reciprocity networks and other social structures. Often these operate more efficiently than kinship alone. These social structures are related to the housing productive forces but indirectly to their low level of 'development'; conditions which are imposed from outside and adopted by necessity (as is the case of the collection of waste materials for building shacks or later the use of rudimentary techniques at developing stages). The fight of social groups to subsist and to reproduce is expressed in the housing production process and in the standards of physical and spatial structures. Cooperation among individuals and among families, which show certain similarities with 'primitive' societies, is seen at various stages of the housing process but especially during the initial stages, when exchange of labour and tools is more likely to occur. Gradually, as housing 'progresses' towards consolidation, the hiring of (badly paid) labour is more common and private property is emphasized. It is common too that the number of dwellers increases at a different pace to that of rooms added. Perhaps the greatest paradox observed is that although the family directly 'controls' the building process and the product, both are often deficient. The quality of housing is not necessarily improved. (See the economic

and climatic functions for this case study, Chapter 5).

The overall marginal conditions of the settlers affect the housing process to the extent that the pace of construction and changes of effective dwelling space are slow and so they lag far behind family growth. Therefore kinship structure at this housing process cannot have a spatial expression. This is so also because kinship does not play a dominant symbolic role in this mode of production.

Accessibility to resources (materials, skilled labour, etc) by the dwellers is mainly determined by their income (which is of the lowest) and the availability of some resources such as land and materials are affected by speculation and prices, in which cases the interest of various fractions of capital are also felt in the slowness of the transformation of the physical structure in particular and of the squatters' settlements in general.

If a dignified organization of dwelling space and built form as well as the equal distribution of the housing product are the objectives of planning the production of housing, such effects should be changed by reversing, or channelling, or avoiding the causes of them.

## 8.4 THE EVOLUTION OF THE ECONOMIC AND POLITICAL ARCHITECTURAL FUNCTIONS AND THEIR MANIFESTATION WITHIN THE TERRITORY

The basic levels of transformation (listed earlier in this chapter - 8.2 - as 1, 3 and 4) of the 'primitive' architectural process transform into particular conditions of the economic and political architectural functions of the two distinct modes of production of housing of

modern capitalist societies (in the Third World). These changes involve both the transformation of the diversity of housing processes on the territory (urban-rural settlements).

Both historical* and territorial** transformations of the architectural functions are reproduced in an increasing number of housing variations. The variety of housing prototypes is related to the economic level to which the housing process belongs. In both economic circuits, production and consumption units are segmented and diversified. In the upper circuit a variety of roles for the participants appears; for instance designers, surveyors, builders, dwellers, etc. are strictly differentiated. In addition, these operate in centralized hierarchic structures, the housing institutions, from which the housing process is controlled, and in construction firms which also function to maximize profits (see Sections 6.2.1 and 6.3).

We can identify degrees of mechanization of sets of building operations on two bases: (1) there is a wide range of processes in which elements and parts are manufactured with different degrees of pre-fabrication, therefore a variety of assembling processes are expected; and (2) the activities of the housing industry in any given territory are split up between a multitude of small and large enterprises and building teams. Construction tends to show a low level of technological innovation, especially in popular housing; and also a low level of training among workers and particularly a low

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* Historical transformations refer to changes, in one or all 'SCAPEB' architectural functions, which occur over a long period of time, or they can be traced by undertaking cross-cultural analysis. See Introduction to Chapter 7.

**Territorial transformations of housing processes or (SCAPEB) architectural functions refer to changes observed between at least two (sets of) housing processes taking place within the same territory. See Introduction to Chapter 7.

number of workers per company (in relation to other branches of industry). These conditions diminish profits, increase costs and discourage investment. All of these characteristics lead to low productivity and in addition perpetuate the housing shortage (see M. Castells, 1977, pp. 115-242, and K. Bassett and J.P. Short, 1980). Therefore antagonistic territorial transformations of the housing morphology are emphasized (see Figures 5.11, 5.12, 6.3 and 6.15 from Mexico City).

In the lower circuit various kinds of building work-teams operate and a variety of household types are found. The family rarely makes up the work-team but the household head acts as a worker and/or his own contractor (occasionally small teams of builders are contracted). Building processes are quite distinct in each economic level although basic construction processes such as brick laying are only different in quality. Four fundamental differences characterize each housing mode of production: (1) the location of land and means of production; (2) size and type of the building production unit; (3) modes of appropriation; private and public ownership; and (4) forms of financing for each housing process.

The selection of highly developed technological means and its application in certain 'mechanized' or 'industrialized' building processes is determined by the overall housing investment and financing system. Thus this is a privilege of housing activities taking place throughout the upper economic circuit. The evolution of building technology has unfolded parallel to the evolution of both the organization of production and the rise of professionalism and its

consequent differentiation of roles*. The evolution of productive forces in construction (in the upper circuit) is directly related to the development of technological means and the mechanization of building processes. The organization of building production becomes necessary as the complexity of building works grows. All these processes developed embodying the interactive combination of technical and class relations. That is, the class division of labour is inherent in the housing processes which spread out in quite distinct variations in terms of quality, such as squatters' housing, commercial housing, middle class and upper class housing designed by architects. In the production of housing by the Government specifically, larger sub-units of production are organized and units of consumption are hierarchically distinguished according to both the assumed level of composition of households and income levels. Socio-economic and housing processes are intrinsically and circumstantially bound at every level. The result of this inter-dependence is a differentiation of housing patterns over geographical space. This represents social stratification and corresponding qualitative and quantitative variations in housing processes (see conclusion of Chapter 4 and Section 4.5). The heterogeneity of these housing patterns are class based, therefore territorial trans-formations of housing and inherent modes of appropriation, are the image of and also foster the reproduction of the stratification of society.

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*See J. Bowyer (1973), History of Building, Part Five: the rise of professionalism. He describes the emergence of the professional designer, the measurer, the builder, the engineer and the craftsman.

## 8.5 THE EVOLUTION OF THE SYMBOLIC ARCHITECTURAL FUNCTION AND ITS REPRESENTATION UPON THE TERRITORY

The symbolic function of the 'primitive' architectural process reflects a unity between the idea and its material realization. For this, interconnections between meaning and value must exist; they are inherent in human needs. Conditions for the realization of ideas lie in the fact that execution is controlled by the dwellers themselves. Also they have direct and free access to Nature by means of simple techniques which have been transmitted through generations.

The symbolic function fulfills needs mainly at two levels. At the ideological social level, kinship structures are represented in the organization of space which in turn responds to the peoples' customs. (See Sections 3.2, 3.4 and Figure 3.2). At the ideological level, other than the social one, a twofold belief system is manifest. It suggests principles which are complementary at particular morphological levels. The belief system identifies antagonistic forces that give origin to life at the cosmic level and at the biological one. Thus space is charged with signs and symbols rooted in the dwellers' cultural practices. This structuring of the symbolic architectural function gives a coherent meaning at all morphological levels, as well as charging the temporal (building and dwelling space) and territorial transformations with a meaningful intrinsic order. (See Chapter 3 and E. Guidoni, 1978, L. Prussin, 1969, and J.P. Lebeuf, 1961).

In order to understand the transformation of the symbolic architectural function from a 'primitive' to a 'modern' society we will synthesize the features of the symbolic function of both prototypes of the housing

process of a modern society: the Government and the popular ones.

The mode of production determines the overall character of the housing process and especially gives expression to the symbolic architectural function. This is clearly manifested at the evolutionary changes the symbolic function has undergone for which these correspond, too, with the economic systems prevailing in a modern society. The historical transformation of the language of the artificial environment is manifested in urban areas as two sets of codes. These are associated with the popular and modern fields. Both sets are diversified and based on semiotic groups but are not determined by social class alone. As Charles Jencks (1977, p. 129) remarks, they ... "are usually a complex mixture of ethnic background, age, history and locale". Nevertheless it is clear that those identified with the lower economic circuit are largely determined by the economic conditions of the settlers and their cultural displacement. Therefore we must recognize two broad groups within popular housing: (1) the urban housing process with a squatter-like background. This is denotable by its changing images along the housing process which often reaches a stabilized state; and (2) vernacular housing which is slow changing ... "full of cliches and rooted in family life". (Ch. Jencks, 1977, p. 130) and has not been affected by rapid urbanization and modernism. In the upper economic circuit the modern code is characterized, in general, by a plurality of semiological properties ...

> "... full of neologisms and responding to quick changes in technology, art and fashion as well as the avant-garde of architecture." (ibid)

Those features that characterize the language of architecture are traced in the processes we are concerned with. In these, the symbolic function plays a misleading role (for the users); that is Government housing acquires an assigned meaning which is generally alien to dwellers. In popular housing, even though it is predominantly controlled by dwellers, symbolism is unintended. (See Sections 8.3.2 and 5.2 and 5.4. Also, later in this section). These conditions unfold in the following manner.

The dweller, in the Government housing process, is in general alienated because the designer deals not with the actual tenant as decision maker but with the legal client. Also, after occupation and throughout the period of use of the building the inhabitants rarely find opportunities to express their identity. Space is inflexible and no changes are possible. So the user has to conform to an environment imposed on him from without.

Two ideologies prevail within the Government housing process: professionalism in institutionalised architecture has set for itself conscious standards of accuracy, precision, verification, aesthetics, and embodies 'modern trends' in architectural styles. The other ideology functioning in this housing process is associated with progress, efficiency, large scale, low-cost and modernity. Both ideologies undoubtedly aim at serving the chosen group better. The result, however, has been that it has also divorced itself from the users and from society. Both ideologies are conveyed in the evolution of solution types and standardized housing prototypes. Designers impose the prevalent mode of living representative of and integrated to the architectural culture. Yet it is obvious, too, that

there is a decline of the architect's 'professional' status due to the introduction into programmes of the prevailing ideology of planning*. As a result the dominant function of architecture (by architects) is shifted**.

Moulded by economic constraints, housing standards usually take the form of minimum dwellings. Housing is impersonal and anonymous. Dwellers tend to be alienated by housing which is externally charged by alien symbols. Alienation is emphasized by the non-participation of dwellers in both production (including design) and maintenance processes, therefore constraining temporal transformations of space.

In the lower economic circuit, the symbolic architectural function is repressed. Symbolism is unintended. Initially, structures (shacks) are neither urban nor rural. Later, by having the urban compactness and the low-rise characteristic of the village, they acquire a distinct morphology (see Sections 5.6 and 5.7, Figures 5.11, 5.12, 5.14). Unlike the case of the 'primitive' process, kinship is not clearly manifest in spatial arrangement, and it is even negated in purpose-built vecindades. At the initial stages of the housing processes these express survival, later submissive and deficient urban integration. Culturally and economically, settlers and the housing process express marginal conditions. Nevertheless at consolidated levels popular housing identifies meanings (images and symbols) with traditional forms. The popular housing process, mainly in medium and

* For an extended and well documented discussion on this issue see Manfredo Tafuri (1976).

**In which case it is overruled by the preponderant political architectural function of this housing process.

large cities, goes through a variety of temporal symbolic transformations. Its symbolic function transforms from its origins, which reveal repressed images to a consolidated level where it acquires a stabilized (slowly-changing) traditional symbolism. Yet popular housing with all its variations represents its place in the social class structure.

The variations and transformations in the architectural symbolic function at the territorial and household levels are represented by the symbolic markings of different areas and housing units within the city. That is, through a multiplicity of signs certain residential areas indicate class membership and status differentiation.

> "Indeed, insofar as architecture is both a consumer and a symbol of wealth and the means by which land is articulated and partitioned, it qualifies as one of the more important languages by which social relations and aspirations are expressed." (Maxwell, 1977, AD Prof. 3, p. 188)

## 8.6 SOME TRANSFORMATIONS OF SOCIAL STRUCTURES AND THEIR EFFECTS UPON THE HIERARCHIC HOUSING PROCESS AND ITS PROTOTYPES

### 8.6.1 Changes of Social Organization, the Role of the State and Interest of Capital

Fundamental historical* transformations have been traced from 'primitive' to modern societies. In 'primitive' societies kinship

*Historical transformations in housing have been defined in Section 7.1 either as a cross-cultural comparison or as if they would have been evolved over a long period of time. The same approach applies to this section. This study does not suggest replacing history but by using such an approach it attempts to understand more clearly how social and economic structures existing in history, at different times or places, shape the artificial environment.

dominates social life. Kinship functions as relations of production as well as forces of production, just as they function as political ones. In Marxist terms, kinship relations seem to be both infra-structure and superstructure (see M. Godelier 1972, p. 364 and Section 2.2). This implies that kinship plays a determining role alongside the economy, whereas in modern societies it is really an element of the economic infrastructure. That means it plays no longer a central role in any one of the housing modes of production. Instead the appearance of the State next to the private* sector integrates the capitalist mode of housing production which dominates the housing process as a whole, within which the popular mode of housing production becomes subordinated. Kinship is no longer important in the structure of production units nor in the organization of the spatial structure of dwellings (as compared to the 'primitive' architectural process). As a unit of production it is replaced by economic and political entities and so displaced from the dominant (industrial and agricultural) production. The most significant change occurs in the structure of the organization of production and consumption (of housing and elsewhere) which acquires its character according to changes taking place at the political and economic levels of the system as a whole**.

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* Private ownership of the means of production and its accumulation in fewer hands subsequently denotes the existence of classes, the State and politics. Also here, the mode of production consists of the articulated combination of the economic, the ideological and the political levels. As distinct to the primitive social formation where there is no State, politics and classes and the mode of production consist of the articulated combination of the economic and ideological levels. See Sections 2.2, 4.2 and B. Hindess and P.Q. Hirst, 1975, p. 41.

**For studies on this subject see COPEVI (1977, Vol. III), Pradilla Cobos,E.(1974),Carmona, F. et al (1970), Sunkel, O. et al (1970), Castells, M. et al (1974) and Unikel, L. et al (1975). (For the latter four see the Bibliography).

Another prominent change traced from 'primitive' to modern societies is the evolution of the money economy in which, in the present era, the capitalist mode of production dominates, and so it has produced and continuously affects the fields in which housing processes take place. Those fields are characterized by the type of flows of money (and goods) and its accumulation (where applicable). Therefore we identified two modes of production of housing that unfold within the upper and lower circuits of the economy (see Sections 4.3 and 4.5). All those changes traced from 'primitive' to capitalist societies have definite effects upon the structure of the housing process and its prototypes.

We observed that the basic differences between the activities of the upper and lower circuit are of a technological and organizational nature (Section 4.5). The upper circuit is a direct result of technological modernisation and concentration of capital and its most representative elements are the monopolies and housing institutions in general and large scale housing production in particular. Monopolies in the construction industry and housing institutions tend to grow in size and small firms tend to disappear (see Section 4.5). This phenomenon occurs in the upper circuit but it does have affects on the lower one. For instance, it is characteristic of the upper circuit that there is strict differentiation of public and private capital and, in every housing process, the intervention of various interests represented by the different fractions of capital operating within the construction industry. Each fraction, working towards the extraction of profits and accumulation of capital, affects housing processes, directly or indirectly, in their production, distribution, exchange and/or

consumption. The State attempts to regulate operations at all levels and stages of the housing process. Very often it does represent or otherwise support the business activities for those interests just mentioned, at both economic subsystems. Nevertheless the direct action of the State in the production of housing at the popular sector is not generalised nor is the intervention of the construction capitalist sector consistent.

The popular mode of production is characterised by small scale housing activities. Building teams are generally composed by the head of the household acting as his own contractor of a small group of builders. Reciprocity networks play an important role initially and at certain stages. The owner-occupier is able to build with his own savings over a long period of time. Materials are recycled but also in later stages they must be purchased from local distributors. Money lenders often play a determinant role in completing the house or rooms. Land is generally the user's property or is being paid in instalments and although the dwelling is for self-consumption and in time acquires a use value, it also acquires an exchange value and so almost at any time it can be ready to sell or rent out. All this means that the interestsof different fractions of capital inter-penetrate the popular housing process at several stages. They are: State and finance capital that operates through the intervention of housing institutions with various types of programmes; landed capital where real estate agencies and landlords speculate upon land (and buildings). The State also purchased large quantities of urban land and therefore also affects land values; industrial capital which is manifest in the monopolisation of production of materials and building elements, parts and systems. All the interactions of the upper circuit activities, of the construction industry

and the State, with the popular housing process, contribute to raise both the cost of production in particular and the value of housing in general (see Section 5.6). In addition they reduce not only the accessibility of lower income groups to the housing market but also the possibility for them to find viable ways to acquire or build a house. Consequently the number of tenants increases as well as the squatter type of development or other variations of housing processes existing within the lower circuit. In terms of the overall housing morphology this interaction of capital and labour of both circuits contributes to the increase of the qualitative disparity of housing within urban settlements and between urban and rural ones. The spatial identification of the interaction of both economic sub-systems led us to identify the variations of the territorial transformations of housing. These are historically determined since every housing area in the territory develops according to the rhythm of the growth of the settlement. Thus political, economic, cultural and geographic factors influence their structure. The territorial transformations of housing are characterized by the heterogeneity of housing built forms and the hierarchy expressed in their quality, size and organization of space. These differentiations ultimately reflect the social class structure with all the contradictions inherent in society.

### 8.6.2 Effects on the Production Unit, Labour Process and Role of Modes of Appropriation

The transformation of labour into having the status of commodity and the prevalent mercantile relations in the production process brings the necessary effect of dissociating the unit of production-consumption. The consumption unit in housing refers to the household

composition which is characterized by its dynamic nature (particularly among low income groups). The productive unit is a team of professionals and, or just, workers; this operates under hierarchically organized, small or large, enterprises. Both social units are quite different from each other in terms of size and structure.

In the 'primitive' architectural process, production and consumption units are circumstantially bound through kinship relations. Relations of production overlap with forces of production. In the housing process of a modern society, in general, kinship is an element of the consumption unit, especially in the upper circuit. In the lower one, certain similarities exist between the 'primitive' and the popular productive unit, such as that found among squatters and settlers of shantytowns. Here the family, though rarely as a whole, make up the building team. Differences between both units of production are expressed in the labour process as well as in the spatial structure and distribution of the product (see Sections 3.2, 3.6 and 3.7). In these popular housing processes the dwellers are obliged to to integrate their efforts into self-built housing, thus suffering a double exploitation: on the one hand dwellers exploit their own labour or underpay construction workers; on the other, dwellers might be workers in other fields of production or, being under-employed, may constantly be hunting for jobs*.

In the housing mode of production of the upper circuit, dwellers are separated from the control of the process. The structure of control is embodied in large and centralized organizations. Within them the

*Conditions of unemployment of under-employment goes up to 40 to 45%. See COPEVI (1978) and SAHOP (1980).

labour force became a merchandise. This means that skilled and unskilled workers sell their labour, therefore wages become the dominant form of labour relations. Production and consumption units are linked through the market or mechanism of distribution. The house goes through these processes before being available for consumption. Housing is produced for exchange. This fact determines the character of the labour process and the housing product. As a result, the possibility of designing flexible house types which would change over time is diminished.

Use-value is emphasized at the popular mode of production. Yet, in this process of transformation, dwellings necessarily acquire an exchange-value (see R. Burgess (1978/79), Sections 1.7, 5.4.2 and 5.6). Part of this housing stock is rented or also might be for sale on the market. Housing productivity for use or exchange brings up the issue of tenure. Initially, tenure plays a central role in improving the physical structures of squatter settlements. Yet the modes of appropriation, at all times, contribute to emphasize opposed territorial transformations of the housing processes. It is obvious thatthe differences in tenure, at both modes of production, are those of the major axes of residential differentiation. (See P. Saunders, 1978; K. Basset and J.R. Short, 1980; and M. Castells, 1977). P. Saunders (1978) suggested that tenurial divisions between owner-occupiers and tenants provide the basis for real divisions of economic interest within the housing field. He argues that owner-occupation brings real material advantages, such as direct dweller control and responsibility for maintenance and repairs, but also provides a basis for housing class formation and political divisions between tenure groups; it also perpetuates

the capitalist system*.

The various modes of appropriation (including all private and public sectors) further emphasize the polarity of the transformation taking place from a classless ('primitive') society to a highly stratified one.

8.6.3 Effects on the Spatial Structure and Building Form

The modalities of tenure in relation to land and building cost and the level of investment (this being determined by the household income level and access to financing) directly, though partially, influence the quality, quantity, status and the form the housing process takes. Land cost determines the size and partitioning of plots. Quality, size and form of housing is directly affected by the rise in the proportion** of land cost with respect to total costs; fewer buildings are built for an increasing amount of money. The philosophy of 'low-cost' housing becomes synonymous with minimum spaces at the expense of higher social costs.

The economic architectural function, led by the rule of profit disguised by architectural and Government ideologies,directly modifies and imposes the character of the spatial organization.

Although the cost of land has generated smaller plot patterns, it is true that its specific spatial organization is affected by cultural

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* See K. Basset and J.R. Short (1980, pp. 209-12), for an extended and well founded discussion on this issue.

**Manfredo Tafuri (1980) asserts that these cost differences are the most important modifiers of architecture in urban areas in the 20th century.

codes and design (see Section 5.2.1). Design objectives can change building techniques and possibly the management of the housing process, but can especially modify the modes in which dwellers and neighbours interact. Yet the effectiveness of professional designers and of their designs is limited to particular projects and programmes within the economic constraints imposed on them.

The dwelling area has its defined limits and generally private and public domains are identifiable. These two domains reach their extremes in low-cost housing. Both dwelling and access areas, such as corridors and stairs, are reduced to a minimum. This is especially critical in monolithic, compact high rise buildings. These conditions are worsened by the impossibility of any spatial modification.

Mainly two spatial forms of urban agglomerations are found: the dispersed suburban, single family house; and the compact high-rise buildings. In both types there seem to be disadvantages, which J.F.C. Turner (1980) expressed in the following terms:

> "... excessive dispersal, like excessive concentration, weakens or perverts relationships between neighbours." (J.F.C. Turner, 1980, p. 5).

Whether taking into account or ignoring the differences in cultural traditions and behavioural patterns, modern architecture - the international style - imposes its morphological principles everywhere in the world.

> "Both modern forms are extraordinarily similar everywhere despite climatic and cultural contrast - they are remarkably insensitive to local differences and the monolithic form, especially, is extremely inflexible and unadaptable. They are already proving to be very short-lived as well as very expensive to build and maintain." (J.F.C. Turner, 1980, p. 5).

The performance of the behavioural function in the popular housing process is deficient. Temporal transformations of dwelling space are possible but only within the limitations imposed by the marginal conditions of dwellers. As a consequence public and private domains are often difficult to define. Paradoxically, because of the scarcity of space, 'communal' areas can be traced (see Section 5.2.2 and Figures 5.8 and 5.9).

It is obvious that the behavioural function is affected by and subordinated to the economic structures and to the function of control. It seems impossible to modify the values and upgrade the level of performance of the behavioural function unless there is a change in the structure and probably a shift in the roles played by the dominant and conditioning (see Chapter 7) functions of architecture in these housing modes of production.

## 8.7 CONCLUSION

In this chapter an attempt was made to identify what and why changes occur in housing processes at the levels of the Behavioural, Economic Political and Symbolic functions, and the effects and results of them as they are traced from 'primitive' to modern societies. While in the former society the causes of housing transformations are mainly found

within the mode of production* of architecture, in the latter they are also, and mainly, due to factors external to it.

Changes of the multifunctional role of kinship and especially the dissociation of relations and forces of production, with its inherent modes of appropriation (and corresponding changes in patterns of production, distribution, exchange in the construction industry and agriculture) contribute to differentiate housing patterns over territory.

These changes in the social structures and processes not only influence the structure of the units of production patterns but they can be traced in the transformations of the organization of space. The various fractions of capital (landed, industrial, commercial, financial and property) within which the maximization of profits is their primary function, integrate the chief modifier** of the pace of production (generally slowing it down in the popular process and accelerating it in the capitalist mode of production), and of the behavioural function of architecture to the extent of constraining the genuine potential transformation of spatial order.

Capitalism continually affects the transformation of the built environment into antagonistic patterns of building forms which express the contradictions inherent in the formation of social classes. These conditions are completely opposed to the conditions within which the classless 'primitive' society and its homogeneous building

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* Except in radical shifts in architectural prototypes which are largely determined by the modes of production/acquisition of food (see Chapter 2).

**Many factors influence processes and transformations of the built environment. A list of these is provided in the section of general conclusions of this thesis.

configurations evolve.

The transformations of housing processes from a 'primitive' society to modern capitalism are the result of mainly: changes taking place in the structure of the economy, at the economic level; changes in relations and forces of production and accumulation of capital; the emergence and performance of the State (the political level); and, changes in the nature of the ideological levels. The particularity of housing processes and their transformations in territory infiltrated by modern capitalism are a result of the interest of the fractions of capital operating within and outside the construction industry, but also they are an effect of the internal structure of production and of the ideologies functioning within every level of the housing process.

Based on the analysis and discussion on processes and transformations of housing made in this and previous chapters, an alternative descriptive framework within which the production and improvement of housing environments may be achieved, is described and discussed in the following chapter (9).

If an alternative organization of production were achieved, would different conditions bring a new spectrum of symbolism, if the dwellers were the agents of the genesis of meanings? Would the functions of symbols emphasize poetry, myths or relationships with nature and other men rather than their rational or practical use? Traditional built forms (or forms evolved from these) might play an important role, nevertheless if a regeneration of past cultures (or generation of culture) and their projection is a primary concern, the symbolic and aesthetic functions will acquire new dimensions, in which case these

functions of architecture must be brought to the foreground. Yet we have learned that the symbolic function is highly interpenetrated and determined by the mode of production as a whole. Therefore attention will be paid in particular to it in Chapter 9, or also in the real world it should be central to planning and political praxis, or to the architectural one if the necessary conditions would be met

# CHAPTER 9

# AN ALTERNATIVE FRAMEWORK FOR THE PRODUCTION OF THE BUILT ENVIRONMENT AMONG MARGINAL COMMUNITIES. PRINCIPLES THAT MAY FOSTER THE EMERGENCE OF AN ALTERNATIVE MODE OF PRODUCTION.

## 9.1 INTRODUCTION

In this chapter an attempt is made to specify the necessary basis, at the political and economic (local) levels, to bring about transformations in the production of the artificial environment for the advantage and benefit of the marginal communities in Third World countries.

It has been implied in previous chapters that not one of the modes of production of housing from modern capitalist societies, specifically the popular and the Government forms of production, is able to solve the housing probem successfully,neither qualitatively nor quantitatively. Furthermore, both modes of production constrain the evolution of the human habitat in terms of its anthropocentric performance (in almost every architectural function) as well as its adequate accessibility and availability for every social group.

Therefore certain principles are introduced here which would encourage the economic organization of the marginal groups into a subsystem in which collective ownership and management (of production in general and housing processes in particular) would predominate.

It is assumed that socio-economic organization prompts or even provides the basis for cultural evolution (this should include the

integration of all members of society into practices in all spheres of human activity). But it can also affect society in the opposite direction: it accelerates or gives way to degeneration or even to its ultimate destruction.

The principles for social and economic structuring may produce or foster a coherent ideology and the emergence of superstructures which should unify the community. Certain existing conditions of production, distribution, exchange and use of housing are discussed in the first place.

## 9.2 SOME CONDITIONS OF HOUSING PROCESSES AND A BASIS TO SUPPORT A DIFFERENT MANNER OF PRODUCTION

Several factors* affect housing processes and their transformations in different ways and have several origins. These are found within the process of production of housing but also outside it in various spheres: within the construction industry as well as in practices apparently completely divorced from this (e.g. production activities and their distribution over space, education levels and systems, etc).

The pace of production in construction and the potential change of spatial and physical structures (as related to the dynamics of the household formation) are primarily affected by the chief function of the different fractions of capital: profit maximization. This factor characterizes the housing modes of production (upper and lower circuits) and affects the transformation of housing processes which

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*A list of them is provided in the section on General Conclusions.

denotes a hierarchic class structure over territory. Yet, these transformations are also a direct function of the structures of production in industry and agriculture (relations versus forces of production, accumulation of ownership of the means of production and the consequent appropriation of surplus value and differentiation of labourers and non-labourers or capitalists. (See Chapters 4 and 8).

The production of housing of the country (Mexico) at large is undertaken by the public sector (18%), the private sector (16.5%) and the Popular sector (65.5% or 2/3 of the total production)*.

Government programmes of financing and production of new** finished housing reach a small minority of middle lower classes and are generally addressed to those having a secured job (e.g. bureaucrats, workers). Nevertheless an increase of investment on self-help housing (autoconstruccion) is taking place, out of which the lower income groups, among these some under-employed, are expected to 'benefit'.

Both types of programme have relatively reduced the cost of housing; the former (internally produced housing) due to the lower cost of land which is purchased in large quantities. The latter, self-help housing, is also cheaper not because of the elimination of certain profits but because it involves the unpaid labour of the future owner and the badly paid labour of the workers employed. In any case every housing programme and project

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* These figures are for the period 1970-1976. Government investment has since been increased, see footnote below.

**Estimated figures of investment for new finished, and financing of the gradually built (self-help) housing are 6.7% and 15% respectively by 1980 and 53% and 32% by 1982 (16% average of investment for maintenance remains almost constant). See Programa Nacional de Vivienda 1979/80).

promoted by the Government is tied to the interest of the different fractions of capital.

Those reductions in cost are not significant enough to bring housing to wider accessibility for most low-income groups. (See Sections 6.3 and 6.6). On the whole, the interaction of the upper circuit activities of the construction industry and the State with the lower circuit tend to raise the cost of housing. Direct effects are the increasing value of land and cost of production in general, and building materials and tools in particular. Building products and raw materials found in the market (such as iron parts, bricks, cement, electrical and sanitary equipment, glass, structural components, etc) are produced by large national or international monopolies. Thus they control the prices and the supply of them. These facts, besides having detrimental effects on the environment , reduce not only the accessibility of lower income groups to the housing market but also the possibility for them to find viable ways to acquire or build a house.* (See Sections 5.6, 8.3, 8.4, 8.7).

Housing provision or financial assistance for the lower stratum of the population is generally non-existent**. This is because of their conditions of under- or unemployment. They can provide no security for the return of capital and interest if loans are given. Also, because the lack of a permanent, officially recognized, organization among the

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* The housing policies stated in the Programa Nacional de Vivienda PNV-Mexico describe many possibilities that will certainly contribute to the upgrading of habitable conditions of some low income groups. There is no doubt that many participants of the housing process will benefit. Within this framework the relation of the State with the dominant fractions of capital operating in the construction industry is strengthened in spite of the support it attempts to give to small producers, cooperatives and self-built housing (autoconstruccion).

**Yet, attempts are being made to carry out programmes in this direction. See Programa Nacional de Vivienda 1979/80, p. 539, Mexico.

poor, which would give confidence in them, seems unlikely to emerge. Otherwise, financing programmes are selective, their implementation short reaching, and subject to political aims.

To produce housing for consumption (even for the middle classes) will no longer be sufficient. And only rarely will this be enough for the lowest income groups, the under-employed or new migrants, unless its supply is coordinated with other productive activities which may increase the meagre income of the poor. Even under such conditions most governments have limited capacity to change income distribution directly and they are also unable to provide employment for the unskilled*. In addition, if distribution and exchange of goods and housing are ruled by the market mechanism and interests within it, the quantitative and qualitative differences between housing processes (e.g. shantytowns and middle class housing) will increase. The provision of housing at any level is a partial solution to a housing problem. This sort of approach will no longer have entire validity. Therefore, housing must be part of a general strategy of development and any solution must be comprehensive. It must be coherent and integrative of every part in its totality. Dwellers, single parents, individuals, groups, and families must be socially, economically, politically and culturally integrated. These objectives should be considered as part of any alternative framework for housing production.

It has been shown, by analysing popular housing (Chapter 5), that a housing process which is directly controlled by the dweller does not

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*Such is the case of new towns in developing countries. Governments and the private capitalist sector are unable to plan housing and employment for a large part of construction workers who remain on the outskirts of the new town, therefore reproducing and antagonizing social classes .

necessarily improve the quality of housing (see Sections 7.3 and 8.3.2). For this an integration of architecture into their cultural practices (as is the case of the 'primitive' architectural process) is required, as well as providing a means to overcome the settlers' overall marginal conditions (in shantytowns and squatter settlements). This implies the introduction of changes in the structure of the economy of the lower circuit. This may need to be incorporated in a new social and economic role of kinship in the various modes of production and consumption within housing processes in particular and social processes in general. Therefore, design, social, economic and physical planning and political praxis must be oriented towards modifying production and consumption of space and goods, in a way which would foster cooperation at various levels in addition to contributing towards the institutionalization of collective ownership and management of land, buildings, and units of production within and outside the construction industry. And this must occur primarily among small-scale producers and the lowest strata of the popular sector.

In other words, any alternative strategic plan must include the reproduction of the necessary basic conditions for collective production; though not only of buildings and housing, for this solution would be partial, but also by stimulating the reproduction of conditions of collective ownership and management of the production of basic goods, foods, furniture, cloth and other articles and materials in which the same people can participate and through which they can recreate their own culture. Excesses of production can always be sold in the upper circuit market or exchanged through units of consumption within the same or similar communities, in such a way as to ensure equal distribution of goods produced or profits made.

## 9.3 BASIC ECONOMIC PRINCIPLES TO ENCOURAGE A TRANSFORMATION OF THE MODE OF PRODUCTION AMONG MARGINAL AND LOW-INCOME GROUPS

An alternative framework of production of housing could therefore evolve on the following basis:

1. Production of housing must be planned in relation to other production (manufacture, industrial or agricultural), the exploitation of resources, and the services located or required in the same urban area or region.

2. The organization of production must be based on collective ownership of the means of production (land, tools, etc) and the product.

3. Thus production and consumption of housing should be organized into cooperatives at various levels and a mechanism must exist to articulate and coordinate units of production and consumption of various kinds (such as workshops, small-scale producers, tradesmen, shops,markets, etc).

4. All these should operate within an autonomous economic SUBSYSTEM.

The combination of 1, 2 and 3 would be subjected to policies at national and local levels, as well as determined by social, cultural, economic, geographic, and locational factors.

Two conditions must be met to achieve the equilibrium of the subsystem:

1. Mechanisms of economic integration of individuals, units of production and consumption must be supported; and,

2. within this mechanism, the redistribution of surplus labour and surplus value must be assured.

These two modes of surplus of production will necessarily appear in a transitional mode of production. Yet, D. Harvey (1973, p. 219) asserts the surplus has to be defined in a way which is internal to the workings of a particular mode of production. This implies that a continuous survey and analysis of the subsystem must be made. A monitoring system with continuous and critical evaluation must exist.

The surplus of production takes the form of:

> "... an amount of material product (over and above that which is necessary to reproduce society in its existing state) that is set aside to promote improvements in human welfare."*
> (David Harvey, 1973, pp. 219-220).

Intrinsically,

> "... each particular mode of production gives definition and tangible form to the concept of a surplus in much the same way that it produces the superstructural forms necessary for the perpetuation of its own existence."
> (David Harvey, 1973, p. 222 referring to Marx's views).

It has been suggested here that it would be necessary to construct and support the necessary mechanisms to redistribute the surplus created within the subsystem itself. Thus the modes of economic integration must be identified. Karl Polanyi (1968, pp. 148-9) distinguishes three distinct coordinating mechanisms: reciprocity**, redistribution,

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* The surplus also appears as a quantity of material resources that is appropriated for the benefit of one segment of society at the expense of another, as is the case of the capitalist mode of production.

**Certain aspects of reciprocity are identified and discussed in Chapter 5, Sections 5.2.2 and 5.6 (see also L.A. Lomnitz, 1977, pp. 200-8). Reciprocity is essential to the survival of low-income groups, like those of Cerrada del Condor and squatters at initial stages.

and market exchange.

He suggests that all three modes of economic integration may be found simultaneously within a given mode of production, although one or the other is usually dominant and fundamental to the functioning of society.

He also (Polanyi, 1968, p. 149) observed that the different patterns of integration assume definite institutional supports.

Reciprocity rests upon specific social networks in the case of the popular sector. Thus it is necessary to stimulate reciprocity to achieve a balanced state (of reciprocity) (Fried, M. 1967). This suggests mutual exchange among individuals or between production units (cooperatives or families) with the amounts exchanged being approximately equal (in the long run) among participants, or otherwise the encouragement of an 'imbalanced' reciprocity to ensure a constant movement from those who have to those who have not.

Redistributive integration involves a flow of goods (into and out of units of production or the subsystem) to support the activities of production units and the community.

In theory, redistributive networks should be maintained through voluntary cooperation but there must be certain rights over output or means of production (as D. Harvey suggested, 1973, p. 210). There may also be moral rights to guarantee the perpetuation of redistributive practices within the economic subsystem.

Market exchange as a mode of economic integration, according to Polanyi (1968), distinguishes between:

i. "a mere locational movement of a product among people"

ii. "exchange of a product at a price set by some social mechanism"

iii. "exchange which occurs through the operation of price-fixing markets".

(in David Harvey, 1973, p. 210).

In order for exchange to be integrative the behaviour of the productive units must be oriented towards producing a price that is favourable to each unit as well as to consumers (Polanyi, 1968, pp. 154-5).

Market exchange occurs under a variety of circumstances. However, as has been suggested by David Harvey (1973, p. 211), market exchange functions as a mode of economic integration only when price-fixing markets operate to coordinate activities*. Yet what must also be aimed for is a fair integration of labour (properly paid) in construction as well as in other economic activities. Therefore if market exchange is to function (within the subsystem) there must be a social mechanism to control and set prices and wages (and rents on land and buildings) which would operate within the subsystem and also those recommended to operate between it and the external capitalist market or between subsystems or units of production of a similar kind (e.g. non-lucrative ones).

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*This is the way capitalism functions. For a brief discussion on the subject see D. Harvey 1973, pp. 210-215 and for an extended one see the original CAPITAL by Karl Marx or contemporary revisions by A. Cutler et al (1977).

Built form and spatial programmes must reconcile the allocation of land and space with the new socio-economic organization of the popular sector, taking into account the potential needs of the community; of individuals and groups. And all of these at the basic spatial levels: household, clusters and neighbourhoods, with their corresponding workshops, market place, open space and community facilities. They should also contribute to bringing about a balanced architectural process within which the majority of people, besides solving their housing problem with dignity, will develop individual capabilities and contribute to the evolution of the culture of the country as a whole.

Alternatively, if no fundamental changes are introduced in the socio-economic structures within the lower circuit, any approach must then be a partial one. In such cases emphasis on research and policy making should be put upon the spheres of action within which the interest of the various functions of capital operate; namely landed capital, financial capital, industrial capital (manufacturing of materials, elements and parts) and commercial (construction itself). Obviously what has been suggested above, to generate a collective culture, will interpenetrate with these capital interests and new interests, community based, will be created within which conflicts will certainly emerge.

A discussion on the implications that the implementation of the model suggested may have is beyond the objectives of this dissertation. Nevertheless, it is an area of research that must be undertaken, especially in order to fill the gap between architectural research and

its practice. This task can not be left to people knowledgeable only about political economy and its relations with production of the built environment. It is surely a responsibility for those architects who care both for people and for architecture.

## 9.4 A BRIEF EXAMPLE; THE POLITICAL ORGANIZATION OF THE COMMUNITY IS FUNDAMENTAL FOR A CHANGE

We can visualise only vaguely how changes might occur. Any change can not be conceived outside the political arena unless it comes as a result of revolutionary action. Thus a new social order must either be promoted within and following the rules of the established political system, or it must be induced by the action of political groups external to the Government; or both may act in coordination. An example similar to the last suggestion took place in Chile. It was mainly organized by the MIR (Movimiento Internacional Revolucionario). The Chilean urban campamentos that emerged under Allende's administration, developed their own civic institutions to deal with a variety of daily problems, such as maintenance of law and order, criminal justice, housing, local administration, etc.

The marginal communities created new alternative institutional forms that offered the basis for greater mass participation and political consciousness in the society at large.

> "In effect, some campamentos had created a small-scale state within a state." (H. Handelman, 1975, p. 40).

Some campamentos were more organized than others. Some of their newly created institutions were designed to meet socio-economic needs of

their inhabitants. In more highly politicized settlements, complex pyramidal structures of block committees, a campamento assembly, and a directorate were operating.

> "Work brigades were created to provide useful employment within the settlement for the large reserve of jobless Other units operated in the areas of health, education, and housing." (H. Handelman, 1975, p. 42).

This experience suggests that it is fundamental for the marginal groups to be first of all politically organized. Without the community-based organization changes in the economic structures they are unlikely to succeed, in the same way that without economic re-structuring, the superstructures (e.g. newly created institutions) may not perpetuate their existence.

As it is the community which must decide how patterns of organization should emerge* so that their institutions and economic structures will respond to their needs and vice versa, it is difficult to visualize what form they will take, although something might be estimated on the basis of a great deal of field work and research. There are many other examples like the Chilean one from Latin America and Mexico (see for instance J. Montaño, 1976) to which reference could be made. Through the analysis and evaluation of the economic, social, ideological and political behaviour of the community a clearer insight might lead to the possibility of prediction. This subject is already beyond the purpose of this chapter, yet it is basic for implementing

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*As distinct from imposed patterns of community organization such as the junta de vecinos (literally, meeting of neighbours) operating in Mexico. Though these became the principal channel of demand making and services provision under the present Government 1976-82; yet here leaders of settlements are often co-opted by top politicians. See Peter Ward, 1980, p. 18, Wayne, A. Cornelius, 1975, and Susan Eckstein 1977.

any proposal. Aid to it must be sought from the theory and practice of community work and development. Here, certainly, a Marxist approach is most useful.

## 9.5 CONCLUSION

Based on the conclusions and suggestions arrived at in previous chapters, an attempt has been made to describe the principles within which an alternative framework or mode of production of housing might emerge. The proposal is addressed to the lowest income group or marginal communities. It has been argued that the production of housing must be part of a comprehensive strategy of development. Transformations advantageous to the communities will only occur if they are based on the following principles.

i. The organization of the communities should operate as an autonomous economic subsystem, in which

ii. the production of housing must be planned and coordinated with other productive activities, and

iii. production and consumption units must be, primarily, collectively owned and managed. This implies

iv. an organization based on cooperatives at various levels, and so a mechanism to articulate units of production and consumption of various kinds must exist.

This mechanism must secure:

a. the economic integration of individuals and units of production and consumption, and

b. the equal redistribution of surplus, among every member of the community (whatever form the surplus may take).

Such economic integration and surplus redistribution should be encouraged by supporting reciprocity, redistribution and market exchange mechanisms. These different patterns of integration assume distinct institutional supports which should complement each other in order to ensure a balanced subsystem, where individuals, groups and families must be socially, economically, politically and culturally integrated in order to regenerate their own culture. Consequently, a different housing process based on these principles should emerge and give way to a harmonious articulation of each one of the architectural functions.

# GENERAL CONCLUSIONS*

## A. METHODOLOGICAL BASIS. POTENTIALS, LIMITATIONS AND CONCLUSIONS

In this thesis the housing problem in Developing Countries has been approached from the point of view of architectural praxis. The housing problem is a qualitative as much as a quantitative one and to propose an alternative 'solution' has been the chief objective of the research. Thus the housing problem and architectural phenomena were approached comprehensively; that is by studying their relation with society at large and by taking into account the variety of factors affecting the transformation of production, the organization of space and the patterns of built form. For this, a structural-functionalist approach was introduced.

The methodological framework involves three distinct concepts: the housing (or architectural) process, architectural function and housing transformation (which has three dimensions: temporal, territorial and historical). It is central to the explanation of architectural phenomena to understand how production processes unfold into spatial organization and built form. Thus production, the building and its use have been seen in this thesis as a continuum, through the many functions they render. Architecture is a poly-functional process and the conceptualisation of the functions seeks to identify and formulate the structure of each function of architecture. Essential to this process is the articulation of all functions in production processes and the building. The functions

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*These conclusions are complementary to those presented at the end of each chapter.

identified are the Symbolic, Climatic, Aesthetic, Political, Economic and Behavioural ones. Every function of architecture has its particular structural traits. The set of functions denotes relationships between the built environment, nature and society. Architectural functions are identified as fields or dimensions of the environment which shape the built form. Reciprocally the architectural process of the building acts as modifier of its own functions.

The SCAPEB functions were applied to particular housing processes and a descriptive model was formulated for each one of them. The processes chosen were the 'primitive', popular and government housing processes. An analysis of transformations within and between them was made. For this the three different concepts of transformation were introduced. Housing as an architectural complex was approached through the analysis of its functions. The housing problem was elucidated by investigating its transformations. Basic to those descriptions is the methodological framework. Therefore the theoretical formulation is fundamental to the explanation and solution of architectural problems, both in research and in practice.

Taking this into consideration, and relying in the research upon comparative analysis of housing processes, it has been demonstrated that the solution to a problem does not spring from its description, but is largely determined by: (a) the research strategy; (b) the arrangement of information within which innumerable feedbacks are present; and (c) the ideological basis of, and the system of concepts structuring the methodological framework.

The chosen methodological tools helped to select and organize

information, and were then applied to the description, explanation and analysis of each housing process investigated, as well as to their transformations. This theoretical approach can extend its problem-solving capacity by using it at implementation stages in various levels and fields of action. The thesis has not been oriented to the design of housing policies in a traditional sense, or to preparing design briefs. Nevertheless the use of the methodology implies a link between research and the praxis leading to the production and transformation of the built environment.

The structural-functionalist approach which was used is comprehensive and multidisciplinary. The effectiveness of the approach has been demonstrated in providing a comprehensive descriptive framework on the basis of which the housing problem and architectural phenomena can be characterized and explained, and it has been shown that it has considerable problem-solving capacity because it enables the analysis of descriptive models through the use of the SCAPEB functions. This provides a way of bridging the gap between architectural theory and praxis. The approach produces operational knowledge which could be applied in production processes. Moreover it is suggested that designers using this methodology could get closer to the customs and real needs of users and generate appropriate design knowledge (see below the principles for its application). It also gives an insight into other spheres of activity, such as politics and planning (social, physical and economic) at local and regional levels. This is demonstrated by analysing the transformations of housing and by providing a framework within which an alternative mode of housing production may

evolve (see Chapter 9). The development of this proposal and the various results of the analysis are largely due to the structuralist principles inherent in the methodological framework. This provides the basis to formulate solutions hierarchically. It also implies the priorities which should be given and so it allows a concentration upon the functions of architecture within which it is sought to achieve the objectives of research without losing sight of the dynamic totality of the housing process.

The comprehensiveness of the SCAPEB functions allows the incorporation of various disciplines in order to elucidate the description and arguments involved in the analysis and comparison of different housing processes. This has certain limitations. The degrees of objectivity and comprehensiveness have been determined by the chief objective of the research and its theoretical framework. Within this we can identify several determining factors which may question the validity of certain results of the investigation.

i. The state of the theory in other disciplines and the way concepts are incorporated and which are the main concerns of the theoretical formulation; and which priorities of analysis fall within architectural praxis, whereby its premises and domain change in history and from place to place.

ii. The information fed into the descriptive models has been taken from a variety of sources. No direct field work was made. Yet the sources are reliable and the information was treated with due seriousness though it has been given the orientation required.

iii. The nature of the housing process to a certain extent dictates the approach to the investigation and description of its functions. For instance the number of functions described varies for every model formulated. Also variations exist in the detail of the description of each one. This brings up the issue of the limits of the domain of each function.

iv. To trace the demarcation of the boundaries of each function's domain presents serious problems of description and analysis. Therefore certain conclusions must remain as hypotheses.

## B. PROPOSALS FOR FURTHER RESEARCH

The weaknesses and potentials of the approach which has been used call for further research on both the methodology itself and strategies of its possible application. Research on the methodology used should aim to provide more solid foundations. This might well be oriented following the issues exposed above.

In relation to (i): the use of concepts from other disciplines should be properly incorporated to the structural-functionalist approach. Special attention should be paid to the proper inclusion of Marxist concepts and theory. This implies a discussion of the use of the dialectical method and historical materialism. Partly, these were used in the thesis.

In relation to (ii): a list of principles for applying the structuralist method used is given below. Within this framework information might

be gathered and organized. Field work may be arranged following the requirements of the model pursued; the investigation of inputs to it based on the identification of the structure of each function may be undertaken.

In relation to (iii): the descriptive model should mirror reality which will at the same time determine the scope of the model in terms of the number of functions and the emphasis put on each one of them.

In relation to (iv): further attempts should be made to define the domain of each function by identifying the interface of the structure of each function with the rest of the set. At the same time account must be taken of the need for flexibility since the nature of problems, in housing and other architectural forms, changes in relation to its mode of production. This implies the need to define in each case the concepts of transformation and of mode of production.

## C. APPLICATION OF THE STRUCTURAL-FUNCTIONALIST APPROACH

Research related to the strategies of the possible application of the methodological approach is conceived based on the following operational basis.

By using the structural-functionalist approach as a working tool in research and practice, the gap between these can be bridged. The underlying premises of this methodological tool, its potentials and limitations, have been discussed before and exposed throughout the

thesis. The following principles may be useful guidance in its application.

1. The conceptualisation of functions should be structural. Once the structure has been identified the description and explanation of how it takes effect follows. Their objective bases must provide allowance for interdisciplinariness and empiricism.

2. Production and the building should mediate the structuring of the functions (see chapter 1)

3. The organization of production should be taken as the basis for effecting spatial structure and built form. Design, being a part of it, must incorporate the participation of users in decision-making. Dwellers must be seen as indispensable to the genesis of meaning.

4. The operational link with practice should seek a comprehensive basis; all functions of architecture may be appropriately articulated in the process within a broader framework based on a comprehensive strategy of development (see Sections 9.3 and 9.4) within which the economic structures might be the target for change. Though the structuring of solutions and the ordering of priorities must spring from real conditions, it is necessary to distinguish:

a. The reality to which the architectural functions are applied, limiting its domain by identifying the nature of the 'elements' involved, relationships between them and the available and potential resources.

b. The set of architectural functions (and their elements) recognized by the users and by the actors (builders and professionals) and how these architectural functions are bound by internal inter-relations into the housing process and/or into partial stages or levels of the same process.

c. The actors (users, builders or professionals) who having free action upon sets of resources and the building, may be able to recognize the boundaries of functional domains, introduce a constant or sporadically renewed accidentality into the functional process and so set the structure of functions into motion, subsequently inducing transformations in various levels. Such a process implies a violation of previous functional norms which can indicate the beginning of a new functional development and hence the development of architecture itself. (Jan Mukarovsky, 1978, p. 242). This is important as far as the shift in the totality of the functional hierarchy results in both the revival of symbolic and aesthetic effects and in the potential development of a genuine Behavioural function. Consequently it is also necessary to identify:

d. The nature of ideologies and their role in a process: whether they can or cannot bring about the expected transformations. The ideologies' potential expressions in the organization of space and built form might be speculated upon and formulated.

5. The strategy of research and implementation should incorporate the analysis of at least two housing processes; the target process and the one evolved in the same region with little or no effect at all by modernizing and capitalist forces. Consequently, the modes of production of housing and otherwise should be

described and their formation, interpenetration and structures should be explained. Subsequently,

6. The different kinds of housing transformations should be properly understood. This means that for each housing process, the dominant and conditioning functions as well as the role played by the secondary one should be identified.

7. Obviously, a survey and analysis of the area or region must include issues broader than the ones described or concerned here in terms of population, geographic-economic conditions, human, material, economic resources, etc. so that the goals of a comprehensive strategy of development (see Chapter 9) may be properly conceived.

The structural-functionalist approach could be applied to housing processes taking place under different conditions from those mentioned in the thesis. They may be related to distinct social formations, such as recently transformed or more advanced socialist systems. Also particular housing processes that belong to capitalist economies may be investigated. They may be related to different socio-economic levels, or the housing of distinct ethnic groups with particular cultural backgrounds. Finally the evolution of architectural prototypes designed by architects may be a subject of research using the approach.

## D. FACTORS AFFECTING HOUSING PROCESSES AND THEIR TRANSFORMATIONS. CONCLUSIONS AND REMARKS

Inherently in this process of analysis is the elucidation of the nature of factors affecting both the performance of the functions,

and the transformations of housing. The housing process yields several architectural functions simultaneously. Yet not all functions contribute to its optimum level of performance; to the balances and changes in space and time. While some functions are critical, others might be altogether absent. A persistent theme of the thesis has been to explain how and why these functions change and whether the agents of change (depending on the effects upon the particular function's domain) would be internal or external to the mode of production; or whether the effector would be traced within a particular social relation to construction, or to space, or to the building, or indirectly or otherwise completely divorced from these. A variety of factors affect housing processes and their transformations in modern capitalist societies. They have been identified and listed below. These are also part of the conclusions arrived at throughout the thesis.

i. The contest for profits by the various fractions of capital operating within and outside the construction industry provides the chief modifier of the pace of production, the organization of space, the domain of dwelling-cells and patterns of built form (see Chapter 8).

ii. The private ownership of the means of production with its inherent patterns of production, distribution, and exchange in construction, and otherwise in industry and agriculture, contribute to differentiate housing patterns over territory (territorial transformations). The accumulation of capital mainly through the extraction of surplus-value in production fosters the division of labour and class formation. This is

directly linked to status differentiation through the overall conditions of housing, its form, location and tenure types (owner-tenant). (See Chapters 4 and 8).

iii. This directly affects income distribution and so the effective demand in housing. It also affects the differentiation of production and consumption units which fosters the development of two different modes of production of housing, in which the capitalist one dominates the propular one. Consequently, antagonistic housing processes spread. (See Chapters 5, 6 and 8).

iv. The State, the accumulation of capital within it and the subsequent organization of hierarchic and highly centralized housing institutions, directly affect housing transformations (as above: i, ii and ii) - see Chapter 6; Section 6.2). This is linked to two complex social processes:

v. The differentiation of labour power into sectors which are engaged in industry, agriculture, administration or services. The tendency of the State is to programme housing for them but only a minimum of selected income groups acquire dwellings. This is determined by:

vi. Political events (especially those directly affecting, changing or dictating new legislation; policies on housing, human settlements, construction, etc.) and economic fluctuations (influenced by previous events such as land use changes affecting the value of land and buildings; an increase in the prices of materials and tools, etc.) which modify the relationships between

housing and society within the mode of production of housing and along the housing processes. Within these, particular effects can be associated with:

vii. The level of development of forces and factors of production in construction within the particular form the labour process takes (see tables of the economic function; Figures 3.12, 5.18 and 6.20, where operational factors were identified as technical knowledge, objects and means of labour, sets of building operations; also, the organization of production was featured for each housing process investigated). For instance:

viii. Technology may be conditioned by its own development, but its selectivity is determined by modes of appropriation and management, economic constraints, size of projects and sites, and in some cases by conditions of soil. It is true that many building methods, tools and systems have been designed for the purpose of saving labour or to ease the task and grant better performance of the operation and of products. Yet, when functioning economically (under cost limits) and when they are joined to complex sequences of operations, they usually mean less labour employed and more profits made.

ix. Inherently in these social processes is the rise and diversification of professional practices, division of labour, and the distinction and separation of designer, builder and dweller. This particularly affects the temporal transformations of housing depending on the role played by each set of participants in the housing process (see Chapters 3, 5, 6 and 8). This includes the

dynamic changes of household formation as well as:

x. The value systems of participants in the process and the nature of the dominant ideology may directly affect housing transformations (see viii above) by modifying the content and quality of performance of the dominant architecture function (see vii above and Chapter 7). This implies changes in the premises and domain of architectural praxis and professional practice. For instance, design techniques and architectural styles inherent within the mode of production in particular historical times have a direct bearing on the transformation of housing built form and spatial organization (see Chapters 3, 5 and 6). This may happen through hidden interconnections (such as expansions of settlements or cultural colonialism) or through direct consequence of:

xi. The structure of the education of architects, planners, engineers, surveyors, etc. and how it is linked to their roles and the functions of architecture (see vii above; see also Pradilla C., E. and Jimenez, C., November 1973). This subject has not been dealt with directly in the thesis, yet it suggests that if the architect is to participate in the production (which includes much more than design) of artificial environment of social concern, he must be aware of factors affecting this which are inherent in every relationship that exists within and between the functions of architecture and between the housing process and society.

xii. Other factors influence housing processes and their transformation such as changes in climatic and geographic conditions,

natural disasters, wars and reconstruction, population growth, migration, etc. Some of these (e.g. climate and city growth) have been dealt with or are implicit in the case studies, others are outside the scope of this thesis.

The primitive architectural process is ecologically balanced. It has been demonstrated that the balance between nature, society and building (process and object) is expressed through the organic articulation of the architectural functions in the processes of production, the building and its use. Central to this is the co-terminality of the spatial structure with familial composition and transformation through which the multifunctional role of kinship and the social relations of production have spatial expression. It must not be forgotten that relations and forces of production interpenetrate and through them an expression of man-nature relations is realized in the architectural morphology charging it with transcendental symbols. Also through such conditions the equitable distribution of space is granted.

The analysis of transformations traced from primitive to capitalist societies elucidates the nature of changes of basic levels of several functions of architecture (namely the Symbolic, Political, Economic and Behavioural ones) within which the nature of symbolism inherent in patterns of spatial and physical structures is originated in the rationalization of production and the structure of units. These are already an expression of the dissociation of relations and forces of production which characterizes the capitalist mode of production. This, being dominant, induces an antagonistic development between the popular and the capitalist housing modes of production and their housing processes.

Such conditions and trends from both societies indicate that the housing problem cannot be solved, either qualitatively or quantitatively, within the modes of production of a modern capitalist society. Therefore in order to foster the evolution of a human habitat and give way to the solution of the housing problem, theoretically and operationally, it is not enough to focus on housing processes, but also, and particularly, attention must be paid to their transformations. This implies, as denoted by the causes and effects of transformations, that the housing problem cannot be properly solved unless an approach to it is centred upon political and architectural praxis. At the same time changes in the premises and domains of this praxis must be introduced. Such changes should affect the education of the architect as much as that of dwellers.

An alternative framework to support the production of the built environment has been suggested. Within this, emphasis was put upon principles which would foster the organization of economic structures. Yet this economic re-structuring must be accompanied by changes in superstructures such as newly created institutions and the ideologies and cultural practices reflecting relationships with nature and other men. As a consequence, the symbolic and aesthetic functions may change and acquire new dimensions which would be meaningful to dwellers and society.

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